

## ORAL ARGUMENT NOT YET SCHEDULED

No. 24-1120 (and consolidated cases)

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UNITED STATES COURT OF APPEALS  
FOR THE DISTRICT OF COLUMBIA CIRCUIT

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STATE OF WEST VIRGINIA, et al.,  
Petitioners,

v.

U.S. ENVIRONMENTAL PROTECTION AGENCY, et al.,  
Respondents.

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Petition for Review of Action of the U.S. Environmental Protection Agency

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**INITIAL BRIEF FOR RESPONDENTS**

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## **CERTIFICATE AS TO PARTIES, RULINGS, AND RELATED CASES**

### **A. Parties and Amici**

Except for the following, all parties, intervenors, and amici appearing in this court are listed in the Brief for Petitioners:

Electric Reliability Council of Texas, Inc., Midcontinent Independent System Operator, Inc. PJM Interconnection, L.L.C. and Southwest Power Pool, Inc. are *amici curiae* in support of Petitioners.

### **B. Rulings Under Review**

References to the rulings at issue appear in the Brief for Petitioners.

### **C. Related Cases**

There are no related cases within the meaning of Circuit Rule 28(a)(1)(C).

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## **GLOSSARY**

CCS	Carbon capture and storage
CO <sub>2</sub>	Carbon dioxide
EERC	Energy & Environmental Research Center
EPA	Environmental Protection Agency
ISOs	Amici Midcontinent Independent System Operator et al.
NEPA	National Environmental Policy Act
PURPA	Public Utility Regulatory Policies Act
RIA	Regulatory Impact Analysis
RTC	Response to Comments

## INTRODUCTION

The challenged Rule properly executes EPA's mandate under the Clean Air Act to control dangerous pollution from fossil fuel-fired power plants. 89 Fed. Reg. 39798 (May 9, 2024). These plants are the nation's largest stationary sources of greenhouse gases. Greenhouse gases drive severe, and at times catastrophic, climate change impacts that are manifesting themselves in the form of massive hurricanes, intense heat waves, rising sea levels, extreme weather, and other harms.

The statute instructs EPA to identify the degree of emission limitation that can be achieved at power plants by applying the best system of emission reduction that EPA determines has been adequately demonstrated. The Rule does so. It calls upon individual plants to employ proven and feasible controls to significantly reduce the dangerous pollution they are presently releasing into the atmosphere.

The Rule contemplates that two categories of plants can employ demonstrated technology to capture most of their carbon dioxide—a greenhouse gas—and store it safely underground. Carbon-capture technology is not projected futuristic technology; it is available and can be applied today. Indeed, power plants have employed carbon-capture technology for decades; the technology was patented nearly a century ago. Carbon capture is not presently in widespread use at power plants, but that is because the industry has had little incentive to control emissions voluntarily, not for any lack of technology.



The Rule, however, avoids a one-size-fits-all approach. It allows plants to select into appropriate subcategories based on their circumstances, with appropriate standards for each that are based on cost-reasonable controls. And, consistent with the Clean Air Act's cooperative-federalism scheme, the Rule maintains States' key role in implementing standards for existing plants.

Petitioners' challenges to the Rule lack merit. Unable to generate a genuine dispute over the Act's meaning, they primarily object to EPA's technical and scientific judgments regarding the dependability, feasibility, and cost of carbon capture (along with objecting to EPA's judgments regarding one alternative control, fuel-switching). But in raising those objections, they largely ignore hundreds of pages of analysis that EPA provided in the administrative record. Disregarding the deferential arbitrary-and-capricious standard, Petitioners then invent extra-statutory constraints on EPA's discretion and urge this Court to substitute Petitioners' own policy preferences for those of the expert agency. The Court should reject these ploys.

Petitioners' hyperbolic claims regarding threats to grid reliability are also unfounded. Those arguments assume the conclusion that the Rule imposes impossible requirements. The record demonstrates otherwise. And EPA thoroughly considered grid-reliability impacts and designed the Rule to avoid disrupting power-sector operation.

In short, the Rule accomplishes precisely what Congress intended. It requires individual plants to use demonstrated controls to meaningfully reduce their voluminous emissions of dangerous pollution. Technology-based standards of this nature are not overreach; they are a cornerstone of the Act.

The petitions should be denied.

### **STATEMENT OF JURISDICTION**

This Court has jurisdiction under 42 U.S.C. § 7607(b), except that Intervenor supporters lack standing. *See infra* Argument I.D.3.

### **STATEMENT OF THE ISSUES**

1. Whether Section 7411 authorizes EPA to select a demonstrated system of emission reduction that will expand the use of technology already deployed within the industry.
2. Whether EPA reasonably determined that 90% carbon capture and storage has been adequately demonstrated, where extensive record evidence reflects that coal and gas plants have already achieved that rate of capture.
3. Whether EPA reasonably determined that 90% carbon capture and storage is the best system of emission reduction for two plant subcategories, considering costs and energy requirements.

4. Whether EPA reasonably determined that sources can timely achieve the required level of emission limitation through 90% carbon capture and storage, where the compliance deadline is not until 2032.

5. Whether EPA reasonably determined that 40% co-firing with natural gas is the best system of emission reduction for medium-term coal plants.

6. Whether emission limits based on measures that will cause individual regulated sources to operate more cleanly fall within the heartland of EPA's statutory authority and thus do not implicate the major-questions doctrine.

7. Whether EPA's emission guidelines properly respect the role of States under the Act's cooperative-federalism framework.

8. Whether EPA established appropriate subcategories for existing coal plants based on their operating horizon, and appropriate subcategories for new baseload gas plants based on their capacity factor.

9. Whether EPA appropriately declined to subcategorize coal-refuse plants, which can meet the same emission limits as other coal plants.

#### **PERTINENT STATUTES AND REGULATIONS**

Pertinent statutes and regulations not reproduced in the addendum to Petitioners' brief are reproduced in an addendum to this brief.

## STATEMENT OF THE CASE

### I. Statutory background

The Clean Air Act establishes a comprehensive and detailed program for air-pollution control with shared federal and state responsibility. Section 7411 directs EPA to list “categories of stationary sources” that “caus[e], or contribut[e] significantly to, air pollution which may reasonably be anticipated to endanger public health or welfare.” 42 U.S.C. § 7411(b)(1)(A). For each category or subcategory, EPA must prescribe federal “standards of performance” for new, modified, and reconstructed sources, *id.* § 7411(b)(1)(B), based on the “degree of emission limitation achievable through the application of the best system of emission reduction” (accounting for enumerated factors) that EPA “determines has been adequately demonstrated,” *id.* § 7411(a)(1), (b)(2). In *Essex Chem. Corp. v. Ruckelshaus*, this Court held that an “adequately demonstrated” system is “one which has been shown to be reasonably reliable, reasonably efficient, and which can reasonably be expected to serve the interests of pollution control without becoming exorbitantly costly in an economic or environmental way.” 486 F.2d 427, 433 (D.C. Cir. 1973).

Promulgation of a new-source standard triggers EPA’s duty to address emissions from existing sources in that source category. 42 U.S.C. § 7411(d) (excluding certain pollutants regulated under other provisions). These

regulations—known as “emission guidelines”—do not regulate existing sources directly, but instead guide each State in submitting to EPA a satisfactory plan to establish, implement, and enforce standards of performance for sources in that State. *Id.* EPA “decides the amount of pollution reduction that must ultimately be achieved” by determining the “best system of emission reduction” for the sources in question. *West Virginia v. EPA*, 597 U.S. 697, 710 (2022). But States may set less stringent standards if justified by circumstances particular to any source, including its “remaining useful life.” 42 U.S.C. § 7411(d)(1).

While States set the existing-source standards based on EPA’s guidelines, EPA retains a key oversight role in ensuring that States’ plans are “satisfactory.” *Id.* § 7411(d)(2)(A). EPA has separately promulgated implementing regulations establishing procedures for States’ submission and EPA’s approval of plans. 40 C.F.R. pt. 60, subpt. Ba. For States that do not submit a plan, or that submit unsatisfactory plans, EPA must directly regulate existing sources in the State’s stead. 42 U.S.C. § 7411(d)(2).

## **II. Factual background**

### **A. Greenhouse-gas emissions and climate change**

The concentration of carbon dioxide and other greenhouse gases in the atmosphere has risen to unprecedented levels because of human activities, and these gases are causing climate change. 74 Fed. Reg. 66496, 66517 (Dec. 15,

2009). In *Massachusetts v. EPA*, 549 U.S. 497 (2007), the Supreme Court held that the “sweeping definition of ‘air pollutant’” in the Act unambiguously covers greenhouse gases. *Id.* at 505, 528-29 (citing 42 U.S.C. § 7602(g)). EPA subsequently determined under the Act that greenhouse-gas pollution endangers public health and welfare through, among other things: sea-level rise; drought, intensified heat waves, and other extreme weather events; harm to agriculture and water resources; as well as sickness or mortality from reduced air quality, and increases in food- and water-borne pathogens. 74 Fed. Reg. at 66497, 66516-36.

Climate change is already occurring at an alarming rate. Last year was the hottest ever recorded, and the last ten years are the warmest on record.<sup>1</sup> The federal government’s latest preeminent report on climate change impacts found that “[t]he effects of human-caused climate change are already far-reaching and worsening across every region of the United States.”<sup>2</sup> It concluded that without rapid and deep reductions in greenhouse-gas emissions, severe climate risks will continue to grow. *Id.*

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<sup>1</sup> Nat’l Oceanic and Atmospheric Admin., Annual 2023 Global Climate Report, <https://www.ncei.noaa.gov/access/monitoring/monthly-report/global/202313>.

<sup>2</sup> Fifth National Climate Change Assessment, <https://nca2023.globalchange.gov>.

## **B. Fossil fuel-fired power plants**

Fossil fuel-fired power plants include steam units (generally coal-burning plants) and combustion turbines (generally gas-burning plants). 89 Fed. Reg. at 39811.<sup>3</sup> A combustion turbine can be either a simple-cycle facility, in which a turbine powers a generator, or a combined-cycle facility, in which a turbine powers a generator and the hot exhaust from that turbine is captured to produce steam, which is used in a steam turbine to power a second generator. *Id.*

In 1971, EPA listed fossil fuel-fired steam units as a source category for regulation under Section 7411. 42 U.S.C. § 7411(b)(1)(A); 36 Fed. Reg. 5931 (Mar. 31, 1971). EPA similarly listed combustion turbines in 1977. 42 Fed. Reg. 53657 (Oct. 3, 1977).

Fossil fuel-fired power plants are by far the highest-emitting stationary sources of greenhouse-gas emissions, responsible for 25% of overall domestic emissions. 89 Fed. Reg. at 39812. Greenhouse-gas emissions from the power sector exceed the emissions from all other industrial sectors combined. *Id.*

## **C. Power-sector emission control technologies**

The Rule focuses on the only two currently available technologies that can be cost-effectively and widely used to substantially reduce greenhouse-gas

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<sup>3</sup> For simplicity, we use “coal plants” and “gas plants” as shorthand for the respective regulatory terms “coal-fired steam generating units” and “fossil fuel-fired stationary combustion turbine electricity generating units.”

emissions from coal plants. The one that can reduce the most is carbon capture and storage (“CCS”). This method removes carbon dioxide from a plant’s exhaust stream using chemical solvents. 89 Fed. Reg. at 39846. After the resulting mixture is heated, the absorbed carbon dioxide can be isolated and compressed for storage, generally via a pipeline to a permanent underground sequestration site. *Id.* In recent years, CCS costs have declined, partly because of process improvements learned from earlier deployments and other technological advances and partly because of additional government support. *Id.* at 39800.

The second method is substituting natural gas for some coal so that the unit fires a combination of coal and natural gas. *Id.* at 39815. This method is called co-firing. Many coal plants across the nation already co-fire natural gas. *Id.* Installing co-firing or increasing the level of existing co-firing generally involves relatively minor modifications to existing boilers, including the installation of gas burners, and may also involve constructing a natural gas pipeline. *Id.*

For new gas plants, the available method that can most successfully limit greenhouse-gas emissions is CCS. *Id.* at 39924-38. Other methods that can reduce emissions include improving efficiency (generating more electricity from less fuel) and using lower-emitting fuels. *Id.* at 39815, 39897.



#### **D. Power-sector trends**

In the last twenty years, market forces and other factors have been driving a transition of the electric power sector away from coal generation. 89 Fed. Reg. at 39816-22; Power Sector Trends Technical Support Document (“Trends”) 19, EPA-HQ-OAR-2023-0072-8920, JA\_\_\_\_. While coal power has historically been the nation’s foremost source of electricity, coal generation has declined steadily in recent years because of, among other things, competition from lower-cost gas and renewable generation. 89 Fed. Reg. at 39817. The share of net generation by coal plants decreased 60% from 2007 through 2022. Trends 6, JA\_\_\_\_.

The market-driven decrease in coal generation is expected to continue. Prior to this Rule, more than half of existing coal plants had announced plans to retire or convert to gas generation by 2039. 89 Fed. Reg. at 39817-18. Modeling by EPA projects that even without the Rule, additional coal generation will retire, and coal capacity will fall from 181 gigawatts in 2023 to 52 gigawatts in 2035. *Id.* at 39822. Independent modeling shows similar trends. *Id.* & n.169. Forces underlying this projected decline include natural gas price decreases, declines in renewable and battery storage costs, increasing coal plant age, increased government incentives and consumer demand for clean energy, and voluntary industry emission-reduction commitments. *Id.* at 39818-23; Trends 7-18, JA\_\_\_\_ - \_\_\_\_.

### **E. Recent federal legislation**

In the last three years, major climate and infrastructure legislation has accelerated these power-sector trends, as Congress has recognized the urgent need to control greenhouse-gas emissions from the power sector and incentivized the development of cleaner power generation. 89 Fed. Reg. at 39818-20; Trends 7, JA\_\_\_\_. In 2021, the Infrastructure Investment and Jobs Act provided significant new funding for clean energy infrastructure and technology. Pub. L. No. 117-58, 135 Stat. 429 (2021). In 2022, the Inflation Reduction Act provided further support and incentives. Pub. L. No. 117-169, 136 Stat. 1818 (2022). In particular, the Inflation Reduction Act substantially increased the tax credit under Internal Revenue Code Section 45Q to accelerate the adoption of CCS. 89 Fed. Reg. at 39819; 26 U.S.C. § 45Q.

## **III. Regulatory background**

### **A. Previous rules**

After determining that elevated concentrations of greenhouse gases in the atmosphere pose endangerment, EPA for the first time addressed carbon-dioxide emissions from power plants in two 2015 rules, commonly called the New Source Rule and the Clean Power Plan. 80 Fed. Reg. 64510 (Oct. 23, 2015); 80 Fed. Reg. 64662 (Oct. 23, 2015).

## 1. The New Source Rule

The New Source Rule established standards of performance for new fossil fuel-fired power plants. This rule is currently in effect.<sup>4</sup> For new coal plants, the New Source Rule is premised on installing CCS. 80 Fed. Reg. at 64549. For new gas plants, the rule established standards for three subcategories based on the degree of plant utilization, with efficient combined-cycle turbines required for new baseload plants contributing significant power to the grid, and the use of “clean fuels” required for the other two subcategories. *Id.* at 64515.

## 2. The Clean Power Plan

The Clean Power Plan established Section 7411(d) emission guidelines for States to follow in developing plans limiting carbon dioxide from existing power plants. 80 Fed. Reg. at 64662. EPA determined the best system of emission reduction for existing plants was shifting power generation (“generation-shifting”) from higher-emitting plants to lower-emitting sources. The Supreme Court stayed the Clean Power Plan near the outset of litigation, and its requirements never went into effect. *West Virginia v. EPA*, 577 U.S. 1126 (2016).

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<sup>4</sup> Petitions for review of the New Source Rule in *North Dakota v. EPA*, No. 15-1381 (D.C. Cir.), have been held in abeyance since March 2017, and new coal plant standards are not at issue in this case.

### 3. The 2019 Rule and *West Virginia*

In 2019, EPA repealed and replaced the Clean Power Plan. 84 Fed. Reg. 32520 (July 8, 2019). In the new guidelines (“the 2019 Rule”), EPA determined that the best system of emission reduction for coal plants was a combination of equipment upgrades and operating practices that would improve facilities’ efficiency. *Id.* at 32535-42. EPA concluded that the application of such measures, however, would result in de minimis, unspecified reductions in emissions. *Id.* at 32561.

In *West Virginia*, the Supreme Court considered the 2019 Rule’s reasons for repealing the Clean Power Plan and confirmed that Section 7411 authorizes EPA to determine the “best system of emission reduction” and the “degree of emission limitation” that sources must achieve. 597 U.S. at 709-10. Applying the major-questions doctrine, however, the Court concluded that EPA lacked authority to identify generation-shifting as the best system of emission reduction.

The Supreme Court distinguished generation-shifting from traditional, technology-based control measures that focus on improving the performance of individual sources. In explaining why the latter types of measures may properly be a best system of emission reduction even though they also have indirect generation-shifting consequences, the Court stated: “[T]here is an obvious difference between (1) issuing a rule that may end up causing an incidental loss of

coal's market share, and (2) simply announcing what the market share of coal, natural gas, wind, and solar must be, and then requiring plants to reduce operations or subsidize their competitors to get there.” *Id.* at 731 n.4.<sup>5</sup>

## **B. The Rule**

On May 23, 2023, EPA published a notice of proposed rulemaking to repeal the 2019 Rule and replace it with revised emission guidelines for existing coal plants. 88 Fed. Reg. 33240 (May 23, 2023). EPA also proposed revised, more protective standards for new and reconstructed gas plants. *Id.*

In May 2024, EPA published the final Rule now under review. 89 Fed. Reg. at 39798. The published Federal Register notice encompasses three independent rules: (1) a repeal of the 2019 Rule, (2) revised Section 7411(d) emission guidelines for existing coal plants, and (3) revised Section 7411(b) performance standards for new and reconstructed gas plants. For simplicity, this brief refers to these rules collectively as “the Rule.”

Consistent with EPA's traditional approach, the Rule's final guidelines and standards are based on technologies that can be applied to individual power plants and reflect EPA's consideration of the factors in Section 7411.

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<sup>5</sup> On remand from the Supreme Court, this Court denied the petitions for review challenging EPA's repeal of the Clean Power Plan and held the remaining petitions challenging the 2019 Rule in abeyance pending EPA's completion of new rulemaking. Order, *Am. Lung Ass'n v. EPA*, No. 19-1140 (Oct. 27, 2022), ECF#1970895.

### 1. Emission guidelines for existing coal plants

For existing coal plants, EPA assessed to what extent control technologies would be feasible and cost-reasonable. This included evaluating the number of years coal plants would need to amortize capital expenditures of candidate controls, considering that a majority of the fleet had already announced retirements, and that more were expected to do so for economic reasons unrelated to this Rule. Based on this assessment and in response to requests from industry stakeholders, the Rule establishes an applicability exemption, and two subcategories, based on plants' intended operating horizons. 89 Fed. Reg. at 39841, 39891, n.377.

First, coal plants that will not operate past 2031 are exempted and have only recordkeeping and reporting obligations—in recognition of the fact that new emissions controls would not be cost-effective given the short period for amortizing the costs. *Id.* Second, for “medium-term” coal plants (plants that intend to operate past 2031 but no longer than 2038), EPA determined that the best system of emission reduction is 40% co-firing. *Id.* EPA specified a presumptively approvable standard of performance for States to apply to plants in this subcategory, which plants are due to meet by January 1, 2030. *Id.* Third, for “long-term” plants (plants that intend to operate beyond 2038), EPA determined that the best system of emission reduction is 90% CCS. *Id.* EPA then specified a

presumptively approvable standard of performance for States to apply to plants in this subcategory, which plants are due to meet by January 1, 2032. *Id.*

For coal plants not subject to the applicability exemption, each plant's final and controlling performance standard is to be more specifically established and implemented by States through plans to be submitted by May 2026 for EPA approval. *Id.* at 39997.

## **2. New source performance standards for gas plants**

For new gas plants, EPA assessed feasible and cost-reasonable control technologies for different kinds of plants according to their utilization. The Rule establishes three subcategories. 89 Fed. Reg. at 39917. New baseload gas plants—defined as units that generate at least 40% of their maximum capacity<sup>6</sup> (i.e., that have at least a 40% “capacity factor”) on both an annual and rolling average basis—are subject to a two-phase standard. “Phase one” is based on efficient design and operation and must be complied with immediately, and “phase two” is based on 90% CCS, with a compliance date of January 1, 2032. *Id.* at 39922-39. New intermediate-load gas plants—defined as units with capacity factors between 20 and 40%—are subject to a standard based on efficient design

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<sup>6</sup> Generation is the measure of a unit's actual output, while capacity is a measure of its maximum potential production. 89 Fed. Reg. at 39810 n.58. A unit's “capacity factor” is its electricity output as a percentage of its total generation capacity. *Id.* at 39811.

and operation. *Id.* at 39917-18. New low-load gas plants—defined as units with capacity factors below 20%—are subject to a standard based on lower-emitting fuel. *Id.* at 39918-22.

The Section 7411(b) new source performance standards are all effective July 8, 2024, and do not require any implementation action by States.

#### **IV. This case**

The Court consolidated 17 petitions challenging the Rule. The Court denied eight motions to stay the Rule pending judicial review. ECF#2065493. In denying the stay, the Court stated that “given the record in this case,” movants’ claims that EPA acted arbitrarily or capriciously in determining that 90% CCS and 40% co-firing were adequately demonstrated were likely to fail. *Id.* at 2. The Court further concluded that the major-questions doctrine does not apply. *Id.*

Movants subsequently filed multiple applications with the Supreme Court seeking similar relief.

### **SUMMARY OF ARGUMENT**

I. *90% CCS*: EPA appropriately identified 90% CCS as the best system of emission reduction for long-term existing coal plants and new baseload gas plants. EPA’s determination that 90% CCS is adequately demonstrated was premised on a comprehensive review of an extensive record. Petitioners’



criticisms of EPA's technical findings misapply the statutory standards, misrepresent the record, and ignore the totality of the evidence.

a. Petitioners' portrayal of 90% CCS as dependent upon forward-looking projections is baseless. Although further technological developments will almost certainly occur, EPA's "adequately demonstrated" determination did not depend upon them. EPA considered instead evidence that 90% CCS has already been shown to work at both coal and gas plants. And Section 7411 undisputedly authorizes EPA to select a demonstrated system that will expand the use of technology within an industry.

b. The totality of the record supports EPA's expert judgment that 90% CCS has been adequately demonstrated. The record includes data from coal and gas plants that have successfully operated 90%-capture systems. That data, in combination with other record evidence, shows that 90% CCS is technically proven and already available for deployment at both coal and gas plants.

c. EPA reasonably determined that sources can timely achieve the required level of emission limitation by applying 90% CCS. An extensive record supports EPA's judgment that the 2032 compliance deadline provides sufficient lead time.

d. EPA reached reasonable judgments regarding control costs. EPA applied the same cost metrics it has applied in other rules and for the relevant

plant subcategories, EPA appropriately determined that 90% CCS costs compare favorably to past rules and are reasonable. As part of this analysis, EPA properly took the CCS tax credit into account, because it reduces the cost to the source of achieving emission reductions. Contrary to Petitioners' argument, EPA was not required to second-guess Congress's taxation policy judgment.

Additional arguments that are raised solely by the two Intervenors for Petitioners should not be considered under this Court's precedent. The two Intervenors also lack standing. Regardless, the arguments raised by them alone lack merit.

e. EPA thoroughly assessed energy requirements, including the Rule's potential effects on electric-grid reliability. Based on extensive analysis and consultation, EPA appropriately determined that controls can be implemented while maintaining a reliable grid. EPA then included multiple provisions as additional safeguards to ensure reliability.

II. *40% Co-Firing*: For coal plants that plan to operate in the medium-term, EPA reasonably found 40% co-firing to be the best system of emission reduction. Fuel-switching is a traditional control method, and EPA permissibly considered it. The record amply supports EPA's judgments that 40% co-firing is cost-reasonable and that sources will be able to successfully implement it by 2030.

III. *Major Questions:* The Rule falls within the heartland of EPA's standard-setting authority and does not implicate the major-questions doctrine. As this Court previously ruled in denying Petitioners' motion for a stay, EPA based the Rule on measures that will reduce pollution by causing the regulated source to operate more cleanly, a type of conduct that falls well within EPA's bailiwick.

IV. *Cooperative Federalism:* The Rule is consistent with the Act's cooperative-federalism structure. Under Section 7411(d), EPA has responsibility for identifying the degree of emission limitation that existing sources must achieve. In performing this responsibility here, EPA did not restrict States' ability to deviate from EPA's guidelines based on source-specific factors. Petitioners' core disagreement is with EPA's separately promulgated Section 7411(d) implementing regulations, but challenges to those are not properly presented here.

V. *Remaining Claims:* The remaining claims lack merit.

a. EPA reasonably created an applicability exemption for existing coal plants that intend to retire by 2032 and reasonably divided remaining coal plants into two subcategories based on control costs.

b. EPA reasonably subcategorized new gas plants based on differences in plant design and operation.

c. Coal-refuse plants can feasibly comply with the promulgated standards. EPA adequately addressed significant comments related to coal-refuse plants, but even if not, any procedural error was harmless.

d. Finally, EPA's authority to regulate coal plants under Section 7411(d) where it regulates different pollutants under Section 7412 has already been upheld by the Court.

### STANDARD OF REVIEW

The Rule is subject to the rulemaking provisions in 42 U.S.C. § 7607(d). The Court may reverse EPA's action only if it was "arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law." 42 U.S.C. § 7607(d)(9). The Court applies "the same standard of review" as in Administrative Procedure Act cases. *Maryland v. EPA*, 958 F.3d 1185, 1196 (D.C. Cir. 2020). That standard "mandate[s] that judicial review of agency policymaking and factfinding be deferential." *Loper Bright Enters. v. Raimondo*, 144 S. Ct. 2244, 2261 (2024). The Court cannot substitute its policy judgment for EPA's. *Motor Vehicle Mfrs. Ass'n v. State Farm Mut. Auto. Ins.*, 463 U.S. 29, 43 (1983). EPA's "technical judgments" likewise receive "great deference." *U.S. Sugar Corp. v. EPA*, 830 F.3d 579, 657 (D.C. Cir. 2016).

An agency's statutory interpretation, made in pursuance of official duty and based on specialized experience, constitutes a "body of experience and informed

judgment to which courts and litigants [could] properly resort for guidance,’ even on legal questions.” *Loper Bright*, 144 S. Ct. at 2259 (cleaned up).

## **ARGUMENT**

### **I. EPA’s determinations regarding 90% CCS are grounded in the record and are reasonable.**

EPA reasonably concluded that 90% CCS is the best system of emission reduction for two types of plants: long-term existing coal plants and new baseload gas plants. A substantial body of evidence supports EPA’s technical judgments, which are entitled to deference.

#### **A. Section 7411 allows EPA to select a demonstrated system of emission reduction that will expand the use of technology already in existence within the industry.**

Section 7411 requires EPA, for both new and existing sources of dangerous pollution, to identify “the degree of emission limitation achievable through the application of the best system of emission reduction which,” accounting for enumerated factors, “the Administrator determines has been adequately demonstrated.” 42 U.S.C. § 7411(a)(1). To do so, EPA must reasonably determine that a system of emission reduction “has been adequately demonstrated” and (after finding it to be the best such system) reasonably identify the level of emission reduction “achievable” using that system. *See Essex*, 486 F.2d at 433 (“It is the system which must be adequately demonstrated and the standard which must be achievable.”).

To find that an emission-reduction system has been “adequately demonstrated,” EPA must establish that the system is technologically sound and that covered sources can, as a practical matter, apply it—but the statute leaves the nature of that evidentiary showing to the EPA Administrator’s “determin[ation].” 42 U.S.C. § 7411(a)(1). As Petitioners acknowledge, Br. 28, something is “demonstrate[d]” when “show[n] by reasoning” or “explain[ed] or [made] clear by using examples, experiments, etc.” Webster’s New World Dict. 2d College Ed. 376 (1970) (“Webster’s”); 89 Fed. Reg. at 39830. By providing that the selected technology need only be “adequately” demonstrated to warrant consideration under the Act—that is, demonstrated to a “sufficient” or “acceptable” degree—Congress left to EPA’s reasonable discretion the process towards and composition of that determination. *See* “Adequate,” Webster’s 16 (meaning “1. enough or good enough for what is required or needed; sufficient; suitable. 2. barely satisfactory; acceptable but not remarkable.”); 89 Fed. Reg. at 39830.

Accordingly, the Court in *Essex* held that an “adequately demonstrated” system is “one which has been shown to be reasonably reliable” and “reasonably efficient.” 486 F.2d at 433. An “achievable” standard, meanwhile, is “one which is within the realm of the adequately demonstrated system’s efficiency and which, while not at a level that is purely theoretical or experimental, need not necessarily be routinely achieved within the industry prior to its adoption.” *Id.* at 433-34. The

Court explained that these terms would not allow EPA to set standards “solely on the basis of its subjective understanding of the problem,” *id.*, but found that EPA could reasonably justify its conclusions based on, e.g., “inspections and ... tests of existing facilities,” “consultation” with industry and other regulators, and “review of available literature,” *id.* at 435, 438. Notably, the Court clarified that to satisfy Section 7411, EPA is *not* required to identify a facility “currently in operation which can at all times and under all circumstances meet the standards” it selects. *Id.*

The statute also does not confine EPA to systems that have already been broadly deployed. *See Essex*, 486 F.2d at 434; *Nat’l Lime Ass’n v. EPA*, 627 F.2d 416, 431 n.46 (D.C. Cir. 1980). In crafting Section 7411, Congress was intent on requiring “the maximum use of available means” of pollution prevention, noting that available technology need not “be in actual, routine use somewhere.” S. Rep. No. 91-1196 at 15-16 (1970); *see* 89 Fed. Reg. at 39831 & n.210 (explaining consonant text in the House report); *Portland Cement Ass’n v. Ruckelshaus*, 486 F.2d 375, 391 (D.C. Cir. 1973) (examining legislative history). EPA thus explained that it “is authorized to promote a system which is not yet in widespread use” so long as the “technology is in existence.” 89 Fed. Reg. at 39830.

Petitioners attempt to manufacture a statutory dispute by emphasizing that in other cases arising under Section 7411, this Court upheld more expansive

interpretations of EPA’s authority to set standards—e.g., allowing EPA to set standards “at a level that is higher than has been actually demonstrated over the long term by currently operating” facilities, provided it has “substantial evidence” that “improved design and operational advances ... are feasible.” *Sierra Club v. Costle*, 657 F.2d 298, 363-64 (D.C. Cir. 1981); *see Portland Cement*, 486 F.2d at 391. Petitioners do not squarely challenge those precedents.<sup>7</sup> But they nonetheless conclude that EPA erred here by relying on “crystal-ball predictions about what may be demonstrated in the future” rather than considering whether CCS “‘has been adequately demonstrated’ now.” Br. 25; *see id.* at 26-43.

Petitioners have it wrong. EPA was clear in the Rule that it was “not relying” on those precedents, 89 Fed. Reg. at 39832 n.223, which were “not relevant” “because CCS is already in existence.” *Id.* at 39830 n.202. Instead, EPA’s assessment of CCS—consistent with *Essex*—concluded that the technology “has been shown to be reasonably reliable” and “reasonably efficient,” 486 F.2d at 433, based on its *existing* capacities and availability within the industry. EPA stated in no uncertain terms that “CCS at a capture rate of 90 percent” “is adequately demonstrated, as indicated by the facts that it has been operated at

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<sup>7</sup> Petitioners’ one-sentence footnote argument, Br. 39 n.8, that those prior holdings are “in error” was not properly presented. *Hutchins v. District of Columbia*, 188 F.3d 531, 539 n.3 (D.C. Cir. 1999) (en banc) (rejecting “cursory arguments made only in a footnote”). But the Court need not reach such arguments anyway.



scale, is widely applicable to these sources, and that there are vast sequestration opportunities across the continental U.S.” 89 Fed. Reg. at 39888, 39813 (“CCS can be deployed at scale today.”).<sup>8</sup> That determination did not require EPA to project or depend on new, “forward-looking” technological developments that might improve the ability of CCS to control emissions in the future. *See* Br. 27. (EPA did reasonably note, though, that such next-generation improvements in the technology will almost certainly occur. *See* 89 Fed. Reg. at 39932-33.)

Nothing in the Rule demonstrates otherwise. Petitioners repeatedly quote passages where EPA (accurately) described this Court’s more expansive holdings. Br. 27, 40-41. But those descriptive passages do not override EPA’s explanation that it was not relying on those outer limits of its authority—nor do they obscure the evidentiary record here, which establishes that CCS is available now.

So too with EPA’s technical analysis. Petitioners claim that the Rule depends on “projections, predictions, [and] extrapolations” about “future technological development” to conclude that CCS is adequately demonstrated. *Id.* at 40-41 (cleaned up). That is wrong. As explained, EPA’s conclusion that 90% CCS is “adequately demonstrated” did not rely on future technological development. Moreover, history and precedent support that EPA may exercise its expert judgment to assess and synthesize existing data without engaging in

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<sup>8</sup> So too with natural gas co-firing, *id.* at 39896, which no one disputes.

“speculative projection about the future,” *id.* at 32—by, for example, extrapolating from independent evidence about separately demonstrated technologies to conclude they can be used together, *see Sierra Club*, 657 F.2d at 373; from test data about one type of facility to draw conclusions about similar types of facilities, 89 Fed. Reg. at 39832 (citing *Lignite Energy Council v. EPA*, 198 F.3d 930 (D.C. Cir. 1999)); or from the use of equipment at individual facilities to assess its use at the scale of the broader industry, *see* 89 Fed. Reg. at 39831-32 (citing *Essex*). Such analysis of the existing technical record is within “the restraints of reasonableness” and not “a ‘crystal ball’ inquiry.” Br. 38 (quoting *Portland Cement*); *see infra* Argument I.B.2.

Petitioners insinuate that the Rule’s nearly eight-year lead time suggests EPA is depending on further technological development. *See* Br. 40-41 (misleadingly quoting text describing precedents EPA affirmed, in that same text, it was *not* applying here). But EPA’s provision of lead time to allow sources to “design, acquire, install, test, and begin to operate” demonstrated technology, 89 Fed. Reg. at 39832, is fundamentally different than “soothsaying about possible forthcoming breakthroughs,” Br. 39; *see infra* Argument I.C. It may take a decade to build a highway; that does not make highways an emerging technology.

Indeed, Petitioners do not dispute that EPA can compel wider adoption of demonstrated technologies (claiming only, and erroneously, that EPA has failed to

show carbon capture is, in fact, demonstrated). Br. 38-39; *see infra* Argument

I.B.2. But compelling widespread adoption necessarily requires accounting for the time necessary for such spread.

Because the Agency based its determination on evidence concerning the availability of CCS technology *now*—as Petitioners demand—the Court need not adjudicate the outer limits of what Section 7411 might allow, nor entertain Petitioners’ claims that EPA has improperly “contort[ed]” the statute “into a license to make forward-looking projections.” Br. 25-26. Instead, review in this case concerns only whether EPA reasonably weighed the available evidence when concluding that CCS is adequately demonstrated. That “highly technical” question is squarely within EPA’s expert discretion under the Act, so the Court’s review must be “correspondingly restrained.” *Nat’l Asphalt Pavement Ass’n v. Train*, 539 F.2d 775, 786 (D.C. Cir. 1976). The Court must “judg[e] whether, given the agency’s expertise in evaluating conflicting data and selecting among reasonable approaches for pursuing statutory goals, EPA has plotted a reasonable course through the evidentiary thicket and stated a logical rationale for the route it chose.” *Sierra Club*, 657 F.2d at 360, 382 (assessing whether EPA “offered a rational explanation for the representativeness of [its] data”). As demonstrated below, EPA has done so here.

**B. EPA reasonably determined that 90% CCS has been adequately demonstrated based on extensive evidence.**

EPA exercised its expert judgment to reasonably determine that 90% CCS is adequately demonstrated for fossil fuel-fired power plants. That determination was based on both data from power plants that have employed commercial-scale capture systems to remove 90% of the carbon dioxide from a designated emissions stream—supported by an extensive survey of capture systems across technical applications, fuel types, and industries—and uncontested evidence that captured carbon dioxide can be safely transported and permanently sequestered.

Unable to dispute that these systems *already* exist, Petitioners attempt to pick apart individual examples, claiming they fail extra-statutory tests and highlighting technical obstacles for which EPA provided comprehensive explanations. Petitioners misapply the statute and misrepresent the record. Moreover, their piecemeal criticism fails to rebut the demonstrative force of this evidence in its totality, especially given the deference owed EPA’s technical judgment.

**1. CCS is not novel.**

Carbon-capture systems that use solvents to remove carbon dioxide from power-plant exhaust and then permanently store the captured gas underground were patented nearly 100 years ago. 89 Fed. Reg. at 39846, 39848. Capture systems’ use at both coal and gas plants dates back decades. The Argus

Cogeneration Plant, a California coal plant, has employed carbon capture since 1978. *Id.* at 39846-47. The Bellingham Cogeneration Facility, a Massachusetts gas plant, operated a capture system from 1991 to 2005. *Id.* at 39926. Likewise, thousands of miles of carbon-dioxide pipelines have operated securely for over sixty years. *Id.* at 39847. Tens of millions of tons of carbon dioxide have been permanently stored underground to combat pollution or as part of processes to recover additional petroleum from oil wells. *Id.*

Indeed, EPA set its first Section 7411 standard based on CCS in 2015, finding nearly a decade ago that up to 23% CCS was adequately demonstrated for new coal plants. 80 Fed. Reg. at 64513. Since then, the technology has continued to proliferate, costs have dropped, and public and industry investment has grown. 89 Fed. Reg. at 39800, 39814, 39852-53. There are currently at least 15 operating CCS installations in the United States, and “another 121 that are under construction or in advanced stages of development.” *Id.* at 39847.

Petitioners do not dispute that CCS is demonstrated and in use. Br. 40. In fact, the energy industry has repeatedly acknowledged that CCS is “proven” and “readily available.” *See* 89 Fed. Reg. at 38813 & n.82, 39852. Petitioners suggest that only some “unspecified level” of CCS is demonstrated, Br. 40, but the fact remains that this technology is neither emerging nor futuristic, *see id.* at 27, 59,

and its components, both individually and together, are deployed within the industry and have been for decades, 89 Fed. Reg. at 39846-78, 39925-31.

Accordingly, EPA's technical judgment in this matter, and the issue this Court must decide, is whether EPA acted arbitrarily and capriciously when determining the *extent* to which CCS can operate to remove carbon dioxide from power-plant exhaust. This assessment of the technology's marginal performance is the type of technical and scientific issue that Congress entrusted to the expert agency.

**2. Ninety-percent capture of carbon dioxide has been adequately demonstrated at fossil fuel-fired power plants.**

The totality of the record supports EPA's technical judgment that 90% capture is adequately demonstrated at fossil fuel-fired power plants. That record includes data from coal and gas plants that have successfully operated 90%-capture systems—Boundary Dam (90%), Petra Nova (92.4%), Plant Barry (90%), Bellingham (95%)—alongside supporting evidence from a diversity of existing facilities operating successfully at lower rates, additional planned facilities being constructed to operate at 90% capture rates or higher, vendor statements and guarantees concerning 90% capture, and other facilities operating CCS outside the power sector. This evidence is addressed across dozens of pages of the Rule's preamble and hundreds of pages in EPA's record.

*Coal:* EPA’s assessment began with several coal plants that have demonstrated consistent operation of 90%-capture systems.

First is Boundary Dam, a Canadian coal plant that has, for the last 10 years, operated a 90%-capture system on a large portion of the exhaust from one of its existing units (Unit 3). 89 Fed. Reg. at 39848. During an early three-day test run in 2016, Boundary Dam demonstrated that its capture system could capture 89.7% of carbon pollution from the exhaust stream of the entire 110-megawatt unit. *Id.* On a permanent basis, Boundary Dam has opted to route the majority, but not the entirety, of that facility’s exhaust through the capture system—between 60% and 85% of the total exhaust stream (called a “slipstream”) when operating 90% capture. *See* Reducing the CO<sub>2</sub> Emission Intensity of Boundary Dam Unit 3 (“Boundary Dam Report”) 6 (Table 1), EPA-HQ-OAR-2023-0072-8691, JA\_\_\_\_; SaskPower Comment 1, EPA-HQ-OAR-2023-0072-0687, JA\_\_\_\_.<sup>9</sup> Between 2017 and 2022, expert data confirms that Boundary Dam’s capture system successfully removed, on average, more than 90% of the carbon dioxide in the routed exhaust slipstream. Boundary Dam Report 6 (Table 1), JA\_\_\_\_ (2017-2022 average of column labeled “CCP Efficiency”); *see also* 89 Fed. Reg. at 39848; SaskPower Comment 1, JA\_\_\_\_ (affirming 90% capture).

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<sup>9</sup> This decision was based on “economic incentives and regulatory requirements,” as well as “technical challenges.” 89 Fed. Reg. at 39848.

As EPA acknowledged, Boundary Dam has contended with technical issues that led to periodic, and occasionally significant, outages of the capture system. But the record shows that those outages primarily resulted from a separate system for removing sulfur-dioxide pollution that impacted operation of the carbon-dioxide capture system. 89 Fed. Reg. at 39848. Plants in the United States generally employ a different sulfur-dioxide removal system, so EPA reasonably determined that Boundary Dam’s sulfur-dioxide-specific technical challenges were not relevant to whether 90% capture was itself adequately demonstrated. *Id.* at 39849. Technical issues directly attributable to the capture system at Boundary Dam, meanwhile, have been largely resolved through further engineering work. *Id.* at 39848-49. The most recent data in the record, for the third quarter of 2023, showed the capture system was available (i.e., online and functioning) 98.3% of the time. *Id.* at 39849.

EPA’s assessment of 90% capture, and of Boundary Dam, is further validated by the Petra Nova project, a Texas coal plant that successfully captured and sequestered 92.4% of the carbon dioxide from a 240-megawatt slipstream (i.e., an exhaust stream equivalent to that from a 240-megawatt facility) between 2017 and 2020. 89 Fed. Reg. at 39849-50; Response to Comments (“RTC”), Ch. 4 at 40, EPA-HQ-OAR-2023-0072-8914, JA\_\_\_\_. While the capture system was not designed to remove carbon dioxide from the facility’s total exhaust stream, the



240-megawatt slipstream is the same size as, or larger than, the total exhaust stream at 41% of all existing coal plants subject to the Rule’s requirements. *See* Greenhouse Gas Mitigation Measures for Steam Generating Units (“Steam Measures”), Attachment 5 (Coal CCS Cost Calculations), EPA-HQ-OAR-2023-0072-9095, JA\_\_\_\_; W.A. Parish Report: Petra Nova 45, EPA-HQ-OAR-2023-0072-0053, JA\_\_\_\_ (Petra Nova demonstrates “commercial scale”). EPA found that this large capture system, which consistently operated above 90% capture and had a demonstrated system availability of 90% with outages decreasing over time, 89 Fed. Reg. at 39850, was further evidence of carbon capture’s technological capabilities, *see id.* at 39889.

Corresponding evidence comes from Plant Barry in Alabama, which used the same capture system later scaled-up for use at Petra Nova. This coal plant began processing a 25-megawatt exhaust stream in 2011, accomplishing 90% capture with *no* reported technical problems during several years of operation. *Id.* at 39850 & n.310 (incorporating facility information in EPA’s 2015 New Source Rule); *see* 80 Fed. Reg. at 64552 & n.210. EPA found that Plant Barry’s capture system, although smaller than its analogue at Petra Nova, yet further affirmed the technology’s capabilities. 89 Fed. Reg. at 39850. And EPA found that, together, Plant Barry and Petra Nova supported that CCS systems can be readily scaled up for application at larger installations—with Petra Nova successfully operating

Plant Barry’s technology at nearly 10 times the scale. RTC, Ch. 4 at 40, JA\_\_\_\_\_ (noting that industry has demonstrated “greater than 5-15x scale up factor[s]”).

EPA also considered, as further corroboration of the technology’s availability, numerous large CCS projects planning 90% capture or more. 89 Fed. Reg. at 39851. For example, Project Tundra is presently constructing a full-scale capture system, based on a successful pilot test, that will capture 95% of the carbon dioxide from both the plant’s 455-megawatt “Unit 2” facility—full capture on a full exhaust stream—and a 30% slipstream at the 250-megawatt “Unit 1” facility. 89 Fed. Reg. at 39850-51; *see* Br. 52. This is equivalent to running full capture at a 530-megawatt facility. 89 Fed. Reg. at 39850-51. Once operational, Project Tundra will capture 4 million metric tons of carbon dioxide per year. *Id.*

The record also included information on additional facilities that have successfully deployed capture systems across the country and with different characteristics, including coal type: the Argus-Searle Valley plant in California that has captured approximately 270,000 metric tons of carbon dioxide annually since 1978 firing bituminous coal; the 320-megawatt Shady Point plant in Oklahoma that for almost 20 years has captured carbon dioxide from a 5% slipstream firing both bituminous and subbituminous coal; and the 180-megawatt Warrior Run plant in Maryland, which has captured about 10% of its total carbon-dioxide emissions since 2000 for secondary use in the food processing industry. *See id.* at 39849 &

n.300 (citing additional discussion of facilities in 2015 New Source Rule), 39853-54 (confirming CCS for different load and coal types). While these facilities are not direct evidence of 90% capture, they further support a conclusion that the technology is broadly deployable and already in use.

EPA identified still more corroborative evidence. Within the industry, manufacturers are offering performance guarantees for 90%-capture systems, citing their extensive experience with these systems. *See id.* at 39847, 39851-52. These guarantees are concrete evidence of the industry's own confidence in the 90%-capture systems presently ready for deployment. *See Sierra Club*, 657 F.2d at 364 (finding vendor statements "informative"). That confidence, EPA noted, is also reflected in state laws supporting or requiring capture systems, including 90% capture, 89 Fed. Reg. at 39852-53, 39821, and in Congress's recent expansion of the 45Q tax credit for carbon-capture systems built to attain at least 75% capture, as well as other infrastructure support for carbon-capture projects, *id.* at 39800, 39819.

Lastly, EPA augmented its review with a survey of how non-power plant industrial sources have deployed this same, or similar, technology. Recognizing that industrial applications outside the power sector are not direct analogues, EPA nonetheless explained that these facilities showed the "broad application" of

systems simultaneously accomplishing carbon capture, transportation, and sequestration. *Id.* at 39847.

*Gas:* EPA separately assessed the deployment of 90%-capture systems at combined-cycle gas plants (the baseload gas units subject to the Rule's 90%-capture standard, *see id.* at 39908-09). The Bellingham Cogeneration Facility in Massachusetts operated from 1991 to 2005 and captured 85-95% of the carbon dioxide from a 40-megawatt exhaust slipstream. *Id.* at 39925-26; *cf. id.* at 39842 (applying the Rule to facilities 25-megawatts and larger). EPA noted that at the time it was shut down due to high gas prices, "the system had logged more than 120,000 hours of CO<sub>2</sub> capture and had a 98.5 percent on-stream (availability) factor." *Id.* at 39926-27. A combined-cycle gas turbine cogeneration project at the Technology Centre Mongstad facility in Norway, though much smaller in size, has also consistently attained "capture rates of over 98 percent" of a 12-megawatt-equivalent exhaust stream. *Id.* at 39927. EPA also noted numerous large new gas facilities that are presently being designed to include 90-95%-capture systems: the 550-megawatt Sutter Energy Center in California; the 896-megawatt Baytown Energy Center and 1,200-megawatt Deer Park Energy Center, both in Texas; and the 900-megawatt Peterhead Power Station in Scotland. *Id.* at 39927-28. In addition, the record included "corroborating evidence" associated with industry's plans for new gas facilities or retrofits of existing gas facilities, pilot tests, and

engineering studies—all proposing at least 90% capture—at facilities in West Virginia, Alabama, Pennsylvania, and elsewhere. *Id.* at 39928-29.

On top of this evidence, EPA explained that the operation of carbon-capture systems at coal plants and these gas plants “is identical” in “the essential ways”: both applications “remove[] CO<sub>2</sub> from post-combustion flue gas by reaction of the CO<sub>2</sub> with amine solvent.” *Id.* at 39926. Accordingly, “[t]he same technology (i.e., the same solvents and processes)” used at coal plants “can be applied to remove CO<sub>2</sub> from the post-combustion flue gas of [combined-cycle gas plants].” *Id.* EPA thus concluded that the extensive evidence of carbon capture at coal plants also applied to its determination that 90% capture is demonstrated at gas plants. *Id.* at 39924-25.

**3. Petitioners’ criticisms of EPA’s 90% capture determination misapply the statutory standard, misrepresent the record, and ignore the totality of the evidence.**

Petitioners’ criticisms fail to rebut the evidentiary showing detailed above. Those criticisms fall short because they seek to impose extra-statutory requirements, misrepresent the factual record on 90%-capture systems’ ability to operate at scale and with consistency, and ultimately fail to engage with the collective weight of EPA’s evidence and the deferential standard of review. As such, Petitioners’ objections are meritless.

Petitioners’ overarching strategy for attacking the factual record is evident in the language used throughout their brief, alleging that the record evidence is inadequate because it did not identify a source that has employed “consistent, annual, facility-wide 90%-CO<sub>2</sub>-capture.” Br. 75. These terms, “consistent,” “annual,” “facility-wide,” and their variants, appear as modifiers in nearly every one of Petitioners’ assertions that the record does not support EPA’s technical determination. *See, e.g., id.* at 39, 40, 44, 45 (“facility-wide 90% capture, transport, and storage of all annual CO<sub>2</sub> emissions”), 46, 47 (“capture on [a] continuous, annualized basis”), 48, 49, 55 (“continuous, facility-wide basis”).

But those modifiers appear nowhere in the statute, nor even in Petitioners’ own construction of the statutory text. *See id.* at 27-28; *supra* Argument I.A. To the contrary, Petitioners’ attempt to conjure more demanding, extra-statutory constraints ignores that the modifier that *is* used by the Act is less demanding: *adequate* demonstration calls for a showing that is “good enough,” not one beyond disagreement. *See supra* Argument I.A; Br. 28 (defining “adequate”). In fact, Petitioners make this argument *themselves* later in their brief, asserting that the word “‘satisfactory’ should *set a low bar*” because it means “‘[a]dequate,’ or ‘just good enough.’” Br. 142 (emphasis added). The plain language thus leaves space for the Agency’s exercise of reasonable judgment, including what conclusions can be reasonably drawn from data before it.

Petitioners’ counter-textual suggestion that Section 7411 requires that the technology have been demonstrated for a particular length of time, at a particular scale, and through a particular type of operation is also inconsistent with the case law. Under *Essex*, adequate demonstration of a technology requires showing only that it is “reasonably reliable” and “reasonably efficient,” *not* that there is a plant “currently in operation which can at all times and under all circumstances” meet the standard. 486 F.2d at 433-34; *see also Sierra Club*, 657 F.2d at 377, 380-82 (rejecting claims that evidence for controls was inadequate because it was from small-scale facilities and did not show continuous performance).

The reason for that is plain: Petitioners’ imagined threshold for adequate demonstration (continuous, annual, facility-wide) would require that at least one power plant *volunteer* to comply with regulatory standards before any such standard has even issued. But there is no evidence Congress intended to narrow EPA’s consideration under Section 7411 to such rare circumstances. To the contrary, Congress directed the EPA “Administrator [to] determine[]” whether a system is adequately demonstrated, 42 U.S.C. § 7411(a)(1), which “expressly delegate[s]” to EPA that technical judgment. *See Loper Bright*, 144 S. Ct. at 2263; *accord Am. Elec. Power Co. v. Connecticut* (“*AEP*”), 564 U.S. 410, 428 (2011) (noting that the delegation under Section 7411 is “altogether fitting” because courts

lack the “scientific” and “technological” expertise needed for “coping with issues of this order”).

To be sure, the evidentiary record here *does* provide ample evidence of commercial-scale, long-term 90% capture, as described in the material above and the additional explanations below. But the Court should reject Petitioners’ effort to create new legal constraints on what evidence might comprise an “adequate” demonstration and to substitute their judgment for that of the expert agency.

Petitioners’ more specific objections also lack foundation and fail to displace the collective weight of the evidence.

**a. Slipstreams**

Petitioners’ central technical objection, as reflected in their linguistic approach above, is that the facilities that have captured 90% of their carbon dioxide have done so on a slipstream—i.e., a portion of the facility’s exhaust stream—rather than on the entire exhaust stream. According to Petitioners, data from these slipstreams is categorically insufficient to demonstrate 90%-capture systems. Br. 45, 49, 50, 51, 54, 55, 57, 58. For many of the cited facilities, this constitutes Petitioners’ sole evidentiary objection. *See id.*

The technical judgment whether such streams are representative for relevant purposes is, itself, entrusted to EPA. EPA reasonably concluded that there were no meaningful differences in the characteristics of slipstreams and full exhaust



streams and that, therefore, capture performance on slipstreams was adequate to demonstrate full-facility performance.

To begin, the slipstreams at both Boundary Dam (65-85% of a 110-megawatt stream) and Petra Nova (a 240-megawatt stream) are larger than the full exhaust streams of many commercial-size power plants, including a significant proportion of coal plants regulated under the Rule. Steam Measures, Attachment 5 (Coal CCS Cost Calculations), JA\_\_\_\_; *see also* RTC, Ch. 4 at 40, JA\_\_\_\_; *Essex*, 486 F.2d at 433-40 (suggesting evidence from individual facilities can be generalized to the industry at large). A slipstream may still represent a significant portion of a facility's full exhaust stream, as Boundary Dam shows. *See* Boundary Dam Report 6 (Table 1), JA\_\_\_\_ (capture slipstream averaging 73% of facility exhaust). And EPA determined that capture systems can be readily scaled for even larger applications, as already evidenced within the industry. *See* RTC, Ch. 4 at 40, JA\_\_\_\_. Petitioners identify no contrary evidence.

Moreover, EPA reasonably concluded that the properties of those slipstreams did not differ from full exhaust streams. In its discussion of Petra Nova, EPA explained that “[t]he properties of the [slipstream] flue gas—composition, temperature, pressure, density, flowrate, etc.—are the same as would occur for a similarly sized coal-firing unit.” 89 Fed. Reg. at 39850. The Agency thus concluded that the successful capture of 90% of the carbon dioxide from the

slipstream “corroborates that the capture equipment ... work[s] at commercial scale and can achieve capture rates of 90 percent” at that scale. *Id.* The Rule also incorporated EPA’s earlier findings in the 2015 New Source Rule, *see id.* at 39848-49, which explained that a slipstream was simply a portion of the exhaust routed toward particular control equipment before being “recombined to exit from a common stack,” not a distinct exhaust stream with dissimilar properties that would affect the nature or operation of the carbon-capture equipment, *see* 80 Fed. Reg. at 64550. EPA’s discussion of this data is adequate to “explain how the[] results” associated with slipstreams “may be used to predict performance in full scale plants throughout the industry.” *Cf. Sierra Club*, 657 F.2d at 341 n.157.

Petitioners’ contrary claims do not get out of the gate. Petitioners assert that because slipstreams are a “partial, fixed, constant stream” (citing NRECA-EERC Comments 5), carbon capture on a slipstream functions more reliably than it would on a full exhaust stream that “would need to contend with dynamic pressure and volumes” (citing NRECA-Cichanowicz Comments 3 & n.7). Br. 46. From this, they conclude that the “two systems are categorically different, and it is much easier to operate [capture systems] on a slipstream” (again citing NRECA-Cichanowicz). *Id.* at 47.<sup>10</sup> But neither comment Petitioners cite supports this

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<sup>10</sup> Petitioners also quote footnote 358 of the preamble, *id.* at 46, but that discussion did not concern slipstreams. It considered the effect on CCS when plants reduce

argument. The EERC comment says nothing about the characteristics of slipstreams. *See* NRECA Comment, Attachment 5 (EERC) at 5, EPA-HQ-OAR-2023-0072-0770, JA \_\_\_\_\_. And the Cichanowicz comment simply states that using a capture system on a plant’s slipstream does not shed light on whether, if the capture system were used on the plant’s full exhaust stream and then went off-line (due to, for example, a maintenance problem), the plant would have to go off-line too. NRECA Comment, Attachment 12 (Cichanowicz) at 3 n.7, 10, EPA-HQ-OAR-2023-0072-0770, JA \_\_\_\_, \_\_\_\_ (referring to the capture system “affecting [the] host unit[’s] reliability”). EPA’s conclusion that capture systems have sufficient availability—that is, that they can operate without undue technical issues and interruptions that would affect the host unit’s ability to consistently generate electricity—is addressed below. But *none* of Petitioners’ cited evidence pertains to slipstreams’ composition or properties, or rebuts EPA’s conclusion that, as a technical matter, capture of carbon dioxide from slipstreams is not meaningfully different than capture from full exhaust streams.

Furthermore, Petitioners’ general suggestion that slipstreams are not representative because they do not account for variable conditions ignores that EPA specifically considered how capture systems would fare under variable load

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their generation and concluded such “turndowns” do not affect overall capture rates. *See* 89 Fed. Reg. at 39853, 39929.

conditions. While EPA acknowledged small reductions in capture efficiency at larger loads, EPA concluded that the evidence showed that “CO<sub>2</sub> capture is, in general, able to meet the variable load of [coal plants] without any adverse impact on the CO<sub>2</sub> capture rate.” 89 Fed. Reg. at 39853-54, 39929 (same at gas plants).

In assessing this data, EPA also reasonably recognized that absent regulation, facilities have little incentive to operate capture systems on entire exhaust streams; these facilities have operated capture systems on slipstreams in keeping with “economics and other business goals,” like contract requirements associated with the use of captured gas in enhanced oil recovery. *See id.* at 39848, 39813 (quoting industry on the influence of the regulatory environment); RTC, Ch. 4 at 40-42, JA\_\_\_\_ - \_\_\_\_\_. The scale of capture at facilities not subject to corresponding regulatory requirements does not signify that the technology can perform only at that scale. *Id.*; *cf. Wisconsin v. EPA*, 938 F.3d 303, 330 (D.C. Cir. 2019) (suggesting that performance when “unconstrained by the ticking clock of the law” does not indicate what is possible).<sup>11</sup>

#### **b. Technical issues**

Petitioners separately suggest that technical issues at Boundary Dam and Petra Nova undermine their evidentiary value for purposes of adequate

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<sup>11</sup> Petitioners’ insinuation that EPA cannot rely on evidence from closed facilities, *see* Br. 54, is also baseless. Facilities close for numerous reasons unrelated to technology capability.

demonstration, Br. 46, 50, but this assertion is similarly disproven by the full record. EPA's record details the technical challenges at Boundary Dam, especially early in its operation, which led to periods when the capture system was not operating and which have, in part, prompted its operators to capture carbon dioxide from a large slipstream rather than the full exhaust stream (a decision that was also economic). 89 Fed. Reg. at 39848-50. Petitioners do not identify any specific technological issue at Boundary Dam that they believe is endemic to 90%-capture systems. They assert instead that the mere fact that Boundary Dam was "online only about 65% of the time" between "early 2021 to early 2023" suggests that 90%-capture systems are not adequately demonstrated. Br. 48. But that argument is flawed.

First, the argument misleadingly excludes the remaining record data for 2023, which showed the facility was available 98.3% of the time in the third quarter of 2023, 89 Fed. Reg. at 39849, as well as data showing 94% availability in 2020, 79% availability in 2019, and 93% availability in 2018. Boundary Dam Report 6 (Table 1), JA\_\_\_\_. More generally, Petitioners ignore that EPA thoroughly explained why each of the technical issues encountered was either irrelevant to U.S. coal facilities (which use different equipment) or has been suitably addressed either directly at Boundary Dam or for other CCS applications. 89 Fed. Reg. at 39848-49. Based on available technical materials, EPA concluded

that issues with Boundary Dam's sulfur-dioxide equipment "will definitively not occur" in the types of sulfur-dioxide controls favored in the United States, which differ from those used in Canada. *Id.* at 39849. And it described the specific "upgrade[s]," "correct[ions]," "optimization" steps, and "mitigation plans" that have been identified and applied to address issues in the capture system like fly ash fouling in heat exchangers, foaming, and biological fouling in carbon-dioxide-absorber wash water. *Id.*; Steam Measures 25-29, JA\_\_\_\_ - \_\_\_\_\_. EPA thus had a sound basis to conclude that Boundary Dam's "technical challenges have been sufficiently overcome or are actively mitigated" and that "the improvements already employed and identified at Boundary Dam can be readily applied during the initial construction of a new CO<sub>2</sub> capture plant today." 89 Fed. Reg. at 39848.

Petitioners broadly suggest that Boundary Dam is capturing emissions from a slipstream because it "cannot" successfully operate a full-stream capture system, relying on Boundary Dam's statement to EPA that it has "optimized" its capture system at 65 to 70% of total facility emissions (but 90% of slipstream emissions) "to ensure a higher level of overall equipment reliability and process efficiency." Br. 47 (citing SaskPower Comment). But as explained above, Boundary Dam's "overall" reliability and efficiency have been affected by sulfur-dioxide control problems that have no bearing on capture at U.S. facilities. 89 Fed. Reg. at 39848. EPA also reasonably explained that the absence of economic or regulatory

incentives to further optimize performance did not speak to the capture system's fundamental capabilities, which have nonetheless been attaining 90% capture on an increasingly large slipstream. *See id.*; RTC, Ch. 4 at 40-42, JA \_\_\_\_ - \_\_\_\_\_. In any case, the 90%-capture systems being offered for deployment now benefit from the decade of lessons learned at Boundary Dam, as record evidence on technology guarantees shows. *See* 89 Fed. Reg. at 39851-52. Indeed, Boundary Dam's operators have confirmed that fixes and upgrades devised at that plant would allow 90% CCS to be built at lower cost on another of their facilities. *Id.* at 39849 & n.299. As a pioneer in the field, Boundary Dam need not operate successfully "at all times and under all circumstances" to constitute an "adequate[]" demonstration of this technology, especially when an additional decade of progress has substantially advanced industry experience with carbon-capture technology.

*Essex*, 486 F.2d at 434.

Petitioners take the same approach with Petra Nova, claiming generally that Petra Nova's experience does not adequately demonstrate capture technology because technical problems kept the unit offline "for more than a third of the time that it was operational." Br. 50. But that assertion includes *all* outages at the facility, not merely those attributable to the capture system. *See* 89 Fed. Reg. at 39850 & n.307. EPA reasonably explained that many of those "outages ... were unrelated to the CO<sub>2</sub> capture facility" and were instead associated with the electric

generating unit itself, extreme weather, an auxiliary combined-cycle plant, and oil-and-gas recovery equipment—none of which “implicate[s] the basis for the EPA’s [best system] determination.” *Id.* at 39850. By contrast, outages attributable to the capture plant “decreased year-on-year” and “were on average less than 10 percent of the year,” which EPA explained was “normal for industrial processes.” *Id.* Furthermore, the specific underlying issues (like leaks associated with gasket materials and vibration from slurry build-up) were addressed with equipment updates, installation of additional components, and regular maintenance. *Id.*

Petitioners claim that EPA’s responses are “Pollyanna optimism” based on speculative projections. Br. 48-49. As discussed, the record disproves that claim. The Rule is clear that these “improvements” are “already employed and identified” and “can be readily applied ... today.” 89 Fed. Reg. at 39848-49, 39850; *Sierra Club*, 657 F.2d at 373; *see generally* Shand CCS Feasibility Study (outlining Boundary Dam operators’ updated designs for 90% CCS), EPA-HQ-OAR-2023-0072-0053 (Attachment 32), JA\_\_\_\_ - \_\_\_\_\_. Expecting facilities regulated under the Rule to apply these *existing* operational and equipment improvements is common sense, not projection. Nor do these technical problems suggest that 90%-capture systems are not demonstrated under the range of operating conditions that regulated facilities might experience. *See* Br. 49; *Nat’l Lime*, 627 F.2d at 433-34, 431 n.46 (explaining that EPA must consider “routine variations in conditions”).



For the reasons above, EPA reasonably determined that these adverse conditions were *not* “reasonably expected to recur” given the additional engineering and equipment changes developed within the industry. And this Court has already recognized that technical issues do not foreclose an “adequately demonstrated” determination where the Agency reasonably explains how technical issues can be overcome. *See Sierra Club*, 657 F.2d at 382. Here, EPA explained that the technical issues *have already been* overcome.

**c. Energy Policy Act of 2005**

Petitioners also briefly attempt to undermine EPA’s record by claiming that Petra Nova and Plant Barry “cannot be used to supply necessary support in the adequate-demonstration analysis” because they received funding under the Energy Policy Act of 2005. Br. 32-33, 50 n.9. But that is not what the text of that act provides. Congress rather specified, nearly 20 years ago, that EPA could not “solely” rely on projects receiving that funding to determine adequate demonstration under Section 7411. 42 U.S.C. § 15962(i). The breadth of EPA’s record shows it plainly has not relied “solely” on those facilities here. *See* 89 Fed. Reg. at 39855, 39879, 39849 n.304 (incorporating explanation from the 2015 New Source Rule).

**d. Other evidence**

Petitioners' scattered attacks on the rest of the record fare no better.

Petitioners claim EPA cannot rely on vendor statements. Br. 53-54 (quoting *Sierra Club*, 657 F.2d at 364). But the Court confirmed that vendor statements could be “informative,” and EPA’s record includes vendors offering *guarantees* of 90% capture. 89 Fed. Reg. at 39851-52 & n.331. EPA never suggested this information was “decisive,” Br. 54, rather than one of many pieces of evidence that weighed in EPA’s determination. At the same time, EPA was reasonable to consider the industry’s own assessment of carbon capture’s capabilities.

So too with planned projects. Petitioners claim it is “folly” to rely on capture projects that are not yet operational when they may not ultimately operate as designed, *id.* at 47, but EPA was clear that it offered this information to corroborate the industry’s confidence in the broad availability of 90% capture, not to independently demonstrate capture technology. 89 Fed. Reg. at 39851; *see Sierra Club*, 657 F.2d at 382 (noting, as persuasive evidence, that industry sources were moving to adopt the technology). Petitioners’ specific objections to planned projects EPA cited do not undermine their value as part of the larger evidentiary record. For example, Petitioners note that Project Tundra will not capture 90% of carbon dioxide from the entire installation, which includes multiple individual generating units. But Petitioners’ own description affirms that Project Tundra

“will be able to scrub the CO<sub>2</sub> emissions at Young Unit 2 (a 455-[megawatt] unit)”—an example of *full capture* at a very large coal unit, even in the absence of any regulatory requirement.<sup>12</sup> See Br. 52.

Petitioners also overread EPA’s reliance on other industrial applications of carbon capture, which—as EPA recognized—employ other methods of carbon capture than those generally favored at coal and gas plants. 89 Fed. Reg. at 39847; Br. 58-59. As explained above, EPA noted these examples in its broad survey of facilities simultaneously accomplishing carbon capture, transportation, and sequestration, 89 Fed. Reg. at 39847, not as “decisive” evidence of 90% capture at power plants.

**e. Applicability of coal evidence to gas plants**

Lastly, Petitioners raise two objections to EPA’s conclusion that 90% capture is adequately demonstrated for combined-cycle gas plants, but both are easily countered. First, Petitioners object that the gas plants successfully using 90%-capture systems are only treating a slipstream; that argument fails for the reasons noted above, as Petitioners marshal no evidence at all that gas-plant slipstreams differ from full exhaust streams. *Supra* Argument I.B.3.a; see Br. 54-

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<sup>12</sup> Petitioners present no evidence that Project Tundra or other planned facilities could not comply with the Rule if required. See Br. 52. Sources may need to invest time and resources to do so, but that is a natural consequence of regulation mandated by Congress, not evidence of arbitrary or capricious action.

55. Second, Petitioners contend that EPA’s demonstration for new gas plants could not consider evidence associated with coal plants because gas and coal plants are “different type[s] of generation” with “different engineering.” Br. 55-56 (noting different carbon-dioxide percentages in coal versus gas plant exhaust).<sup>13</sup>

That argument is contrary to *Lignite Energy Council*, which held that EPA may base determinations on data about a technology’s performance at similar sources. 198 F.3d at 933-34; see Br. 36 n.7. As noted above, the Rule specifically discussed the basic technological commonalities, like “the same solvents and processes,” that make 90%-capture systems essentially identical between coal and gas plants. 89 Fed. Reg. at 39926. EPA found that “the only differences in application” of such systems between the two types of plants “are related to the differences in composition of the respective post-combustion flue gases,” but that “these differences do not preclude” capture at gas plants. *Id.* EPA explained that although exhaust streams from gas plants contain a smaller percentage of carbon dioxide and that capture of “dilute concentrations is more challenging,” adjusting the size and design of the equipment would address that difference. *Id.* EPA affirmed it included such adjustments in its overall “best system” analysis. *Id.*

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<sup>13</sup> Petitioners also object to EPA’s reliance on evidence from Bellingham because the facility sold, rather than sequestered, the captured carbon dioxide. *Id.* at 54. But the disposition of the carbon dioxide is irrelevant to the success of the plant’s capture system, which is why EPA cited the plant. 89 Fed. Reg. at 39926.

Moreover, EPA confirmed that chemical solvents capable of realizing 90% capture from “dilute CO<sub>2</sub> streams” are “commercially available” and, indeed, have been shown to remove carbon dioxide even at concentrations “less than the concentration of CO<sub>2</sub> in the atmosphere.” *Id.* at 39925-26.<sup>14</sup>

EPA also noted that exhaust streams from combined-cycle gas plants have “few, if any, impurities” compared to coal-plant exhaust and so are “easier to work with for CO<sub>2</sub> capture.” *Id.* Based on this information, EPA concluded that evidence underlying its determination for coal plants also applies to gas plants and that, in fact, capture systems at gas plants “will in general face fewer challenges than [those systems] at coal [plants].” *Id.* Contrary to Petitioners’ suggestion, EPA thoroughly explained its consideration of this evidence; that explanation, along with other available data, was sufficient to find 90% capture adequately demonstrated at gas plants.

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Ultimately, Petitioners’ argument depends on treating each piece of the record as if it exists in isolation and comprises, by itself, the basis for EPA’s determination. Those arguments fail for the reasons above. But, more

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<sup>14</sup> The cited Department of Energy report is not evidence otherwise. *See* Br. 56 n.10. That 2017 report does not reflect recent developments and, in any case, confirmed that “capture technologies appropriate for natural gas systems have been proven technically feasible.” *See* Carbon Capture Opportunities Report 2, EPA-HQ-OAR-2023-0072-8734, JA \_\_\_\_.

significantly, Petitioners fail entirely to engage with the nature of EPA's delegation, which is to assess the *totality* of available evidence to reach a judgment as to whether this technology has been adequately demonstrated. Collectively, evidence from facilities that have used large-scale, long-term 90% capture is sufficient to demonstrate, in tandem with the other record evidence, that 90%-capture systems can be successfully and broadly deployed at both coal and gas plants. This record exceeds that for other Section 7411 determinations that this Court has upheld. *See, e.g., Essex*, 486 F.2d at 440 (upholding a standard based on scrubbers in use at only three plants, where none had achieved the standard, *see* 37 Fed. Reg. 5767, 5768 (Mar. 21, 1972)). EPA's expert consideration and synthesis of this evidentiary record is well within the range of discretion afforded by the Act and this Court's deference to such technical judgments.

**4. Disposal of captured carbon dioxide is plainly demonstrated.**

Petitioners do not claim that disposal of carbon dioxide through pipeline transport and geologic sequestration is not adequately demonstrated. *See* Br. 56-57 (claiming only that EPA has not shown these functions “paired with” a “consistent 90% capture system”). Nor could they: EPA's determination that such disposal is adequately demonstrated is based on an extensive historical record. 89 Fed. Reg. at 39855-61, 39929 (transport), 39862-74, 39930 (sequestration). EPA explained that carbon dioxide can be moved by “pipeline,” “vessel,” “highway,” or “rail,” but

pipelines are “generally more economical” than other methods. *Id.* at 39856, 39889. Carbon-dioxide pipelines “have been in use across the country for nearly 60 years.” *Id.* at 39855. “In the past 20 years, 500 million metric tons of CO<sub>2</sub> moved through over 5,000 miles of CO<sub>2</sub> pipelines.” *Id.* at 39860. Storage in “subsurface geologic formations” is similarly “well proven and broadly available throughout the U.S.” *Id.* at 39862. The Department of Energy has “demonstrated geologic sequestration through a series of field research projects,” “injecting more than 12 million tons of [carbon dioxide].” *Id.* at 39864. Consistent with that general evidence, EPA identified more than a half dozen facilities that have successfully disposed of captured carbon through pipeline transport and permanent sequestration, including Boundary Dam, Petra Nova, and Plant Barry. *Id.* at 39847-50.

**C. EPA reasonably determined that sources can timely achieve the required level of emission limitation by applying the best system.**

Along with determining that 90% CCS is the best system that has been adequately demonstrated, EPA determined the “degree of emission limitation achievable” by covered sources through the application of 90% CCS.<sup>15</sup> 42 U.S.C.

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<sup>15</sup> Those degrees of emission limitation are an 88.4% reduction in the annual emission rate of carbon dioxide for existing coal plants and an 89% reduction for new gas plants. 89 Fed. Reg. at 39802, 39948. In accordance with the process set out in Section 7411(a)(1), EPA also calculated standards of performance (or, for

§ 7411(a)(1); 89 Fed. Reg. at 39841, 39948, 40046. Specifically, EPA determined that covered sources can achieve the emission limitations by installing “capture facilities,” constructing “pipelines,” and developing “sequestration sites”—and that they can do so by the January 1, 2032 compliance date. 89 Fed. Reg. at 39878 & n.612, 39939. EPA’s determinations, based on hundreds of pages of scientific and technical analysis, including reports by the Department of Energy and expert engineering firms, are reasonable and entitled to deference.

Petitioners’ scattershot attacks on EPA’s achievability conclusion fail to overcome this deference, rely on their own administrative comments as the sole support for their claims while ignoring EPA’s responses to those comments and the broader administrative record, and otherwise lack merit. *See* Br. 60-75.

Petitioners’ arguments are also largely premised on two fundamental misconceptions.

*First*, whether emission-reduction infrastructure is *presently* in place does not determine a standard’s achievability. *Contra, e.g.*, Br. 116 (“The infrastructure needed to make the limit achievable *now* does not exist.”). “Achieve” means “to do; succeed in doing; accomplish.” Webster’s 11. The adjective suffix “-able” means “capable of being.” *Id.* at 3. Thus, “achievable” means capable of being

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existing sources, presumptively approvable standards) that reflect those degrees of emission limitation. *Id.* at 39841, 39948, 39958-59.



accomplished. Here, EPA determined the degrees of emission limitation that are capable of being accomplished by the compliance date, even though necessary infrastructure is not presently in place.

It is not surprising that emission-reduction infrastructure is not presently in place. Again, sources do not generally control their pollution before they are required to do so. And because “pollution control systems” can be “complex,” regulated parties often need time to “acquire,” “install,” and “begin to operate” those systems. 89 Fed. Reg. at 39832. Under Section 7411, EPA therefore “has typically allowed for some amount of time before sources must demonstrate compliance.” *Id.* EPA did just that here, finding that “January 1, 2032, is an achievable compliance date” given “the technical and bureaucratic steps necessary to install and implement” the technology. *Id.* at 39875.

*Second*, “every existing” coal plant need not achieve a standard based on 90% CCS. *Contra* Br. 60. Most existing plants have already announced dates for retirement or conversion to 100% gas before 2039, and therefore they will not be subject to such a standard. 89 Fed. Reg. at 39875-76. Moreover, if a particular coal plant with plans to operate through 2039 faces unique circumstances that make achieving a standard on EPA’s timeline unreasonable, the State can account for those circumstances in its state plan by setting less stringent standards or

providing an extended compliance deadline. *Id.* at 39962 (citing 40 C.F.R. § 60.24a(e)-(f)).

**1. Covered sources can achieve standards based on 90% capture.**

EPA reasonably determined that 90% capture is “technically feasible” and the resultant standards are “achievable over long periods.” 89 Fed. Reg. at 39847. Petitioners challenge this achievability determination for existing coal plants, arguing that retrofitting them with 90% capture technology “is often prohibitively difficult given space constraints and technical challenges.” Br. 60. Petitioners do not elaborate on the supposed technical challenges—and there are none. *See supra* Argument I.B.3.b (explaining that past technical challenges have demonstrated fixes). As for the alleged space constraints, EPA determined that all coal plants have sufficient space to install capture equipment. 89 Fed. Reg. at 39886 (considering available information, “including the location of [coal plants] and visual inspection of the associated maps and plots”). EPA explained that, while some commenters brought up space constraints, they “provided no data or analysis to support their assertion.” *Id.* The same is true for Petitioners’ brief. They speculate that a source may be unable to site multiple trains of carbon-capture equipment,<sup>16</sup> Br. 60-62, without acknowledging, let alone refuting, EPA’s siting

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<sup>16</sup> Petitioners greatly overstate the possibility that covered sources will install multiple trains of capture equipment. Br. 60-62. The record does not indicate that

analysis, 89 Fed. Reg. at 39886. They thus forfeit any specific challenge to that analysis. *Al-Tamimi v. Adelson*, 916 F.3d 1, 6 (D.C. Cir. 2019) (“A party forfeits an argument by failing to raise it in [its] opening brief.”).

Petitioners’ related argument—that EPA erred by not explaining how the use of multiple trains of capture equipment would be cost-effective or approved by regulatory authorities—also misses the mark. Br. 61. The Rule explained at length why implementation of carbon-capture technology is cost-effective. *See* 89 Fed. Reg. at 39879-83, 39932-35; *infra* Argument I.D. Again, Petitioners merely speculate that installation of multiple trains may not be cost-effective without acknowledging or contesting EPA’s cost analyses. And EPA is not obliged to explain how multivarious sources can navigate their internal financing and regulatory-approval processes. *See Env’t Def. Fund v. EPA*, 922 F.3d 446, 458 (D.C. Cir. 2019) (“Nothing in the APA saddles agencies with the crushing task of responding to every single example cited in every single comment[.]”).

Lastly, Petitioners raise the specter of supply-chain bottlenecks due to many CCS projects being developed simultaneously and claim EPA “ignores” this issue.

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any plants require multiple trains, *see* RTC, Ch. 4 at 40, JA\_\_\_\_, but if any do, they would be only the largest plants, of which only a few intend to operate beyond 2039, *see* Steam Measures, Attachment 5 (Coal CCS Cost Calculations), JA\_\_\_\_ (showing, of units without announced retirements or conversions before 2039, only 12% (28/236) are above 750 megawatts and less than 2% (4/236) are greater than 1,000 megawatts).

Br. 61. But EPA explained that sufficient resources and the necessary workforce are readily available. 89 Fed. Reg. at 39877-78 (citing Department of Energy assessment). Petitioners again fail to acknowledge or preserve any challenge to EPA's analysis.

**2. Covered sources can achieve standards based on carbon-dioxide transport.**

EPA reasonably concluded that covered sources will be able to transport carbon dioxide to sequestration sites in the compliance timeframe. 89 Fed. Reg. at 39855-62, 39929-30. Most plants are near deep saline formations that have the potential for long-term carbon-dioxide storage sites. *See id.* at 39856 (explaining that 91% of existing coal plant capacity is within 100 miles of deep saline formations). EPA concluded that due to their proximity to storage, existing sources can build shorter source-to-sink pipelines, rather than needing to rely on a trunkline network buildout.<sup>17</sup> *Id.* at 39889. In addition, for new baseload gas plants, sources may consider access to carbon-dioxide transport and storage in deciding where to build. *Id.* at 39925.

Petitioners' arguments that standards based on carbon-dioxide transport are unachievable lack merit. Br. 62-66. Petitioners' primary objection—that most

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<sup>17</sup> The U.S. carbon-dioxide pipeline network includes major trunkline pipelines as well as shorter, smaller capacity pipelines connecting a carbon-dioxide source to a larger trunkline (i.e., lateral pipelines) or to a nearby carbon-dioxide end-use (e.g., source-to-sink pipelines). 89 Fed. Reg. at 39856.

plants do not *presently* connect to a carbon-dioxide pipeline, *see id.* at 62, 64— fails because the present state of infrastructure does not determine what is achievable by January 1, 2032, *supra* Argument I.C.

Petitioners next seek to cast doubt on the achievability of standards based on carbon-dioxide transport by drastically inflating the length of new pipeline that will be needed. Br. 62-63 (citing their own comment projecting the need for a vast 115,000-mile “pipeline network”). But, as explained, EPA’s Rule is not predicated on the buildout of a pipeline network but rather the construction of short source-to-sink pipelines. 89 Fed. Reg. at 39855. Under this analysis, EPA’s modeling shows that about 5,000 miles of pipelines would be constructed by 2032. *Id.* at 39856. This equates to an average buildout of 1,000 miles of pipeline per year over five years, which resembles the buildout rate of other types of pipelines in the country. *See id.* (explaining the annual mileage of natural gas pipelines constructed during 2017-2021 ranged from about 1,000 to 2,500 miles).

Next, Petitioners contend that permitting, right-of-way, and litigation issues make standards based on carbon-dioxide transport unachievable. *See* Br. 65-66. Not so. EPA reasonably determined that those issues are surmountable, describing many examples of developers successfully navigating the hurdles and completing carbon-dioxide pipelines. 89 Fed. Reg. at 39858-59. EPA also explained that States and the federal government are seeking to expedite pipeline siting and

construction. *Id.* at 39858-61. EPA added that permitting and right-of-way challenges are likely more difficult for large multi-state trunkline projects, but the best system of emission reduction here hinges on shorter source-to-sink pipelines, which are less challenging to permit and build. *Id.* at 39861.

Petitioners disagree that shorter pipelines are easier to permit and build than long, interstate pipelines. Br. 65.<sup>18</sup> In support of their counterintuitive proposition, Petitioners cite an example of a natural gas pipeline project that involved six years of regulatory proceedings and litigation alone. *Id.* (citing *PennEast Pipeline Co. v. New Jersey*, 594 U.S. 482, 490-92 (2021)). But a natural gas pipeline project that was litigated all the way to the Supreme Court is not representative of the typical permitting timeline for shorter carbon-dioxide pipelines. The record shows that source-to-sink carbon-dioxide pipeline projects can generally be completed in 5.5 years, which includes time needed for routing, permitting activities, and right-of-way acquisition. *See infra* Argument I.C.4.

To be sure, there may be pipeline projects subject to delays that take longer than 5.5 years. And Petitioners are correct that even if “*most* facilities have access to potential geologic storage nearby,” some may not or may encounter hurdles that

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<sup>18</sup> Petitioners take the exact opposite position elsewhere. *See* Br. 124 (“Lateral pipelines connect a facility to a nearby existing pipeline, and as a result, they tend to be shorter in length (taking less time to construct) and not as controversial because they tap into an already-existing pipeline (taking less time to permit).”).

prevent timely compliance. Br. 64. But that does not mean a longer source-to-sink pipeline will be unreasonable to construct. And, as explained below, the Rule includes a mechanism for a compliance-date extension for delays that are outside a plant's control. *Infra* Argument I.C.4; 89 Fed. Reg. at 39874 (coal), 39952 (gas). Additionally, for existing coal plants, if there are site-specific impediments to getting pipelines completed in time, that can be also addressed through the state planning and standard-setting process. *Id.* at 39860.

**3. Covered sources can achieve standards based on carbon-dioxide storage.**

EPA reasonably concluded that covered sources will be able to store carbon dioxide in the compliance timeframe. 89 Fed. Reg. at 39862-69, 39930. The record shows that geologic storage reservoirs are broadly available throughout the United States. *Id.* at 39862-65; Steam Measures 38-41, JA \_\_\_\_ - \_\_\_\_\_. The capacity of those reservoirs is vast, estimated to be at least 2.4 *trillion* metric tons, while EPA estimated that covered sources will need to store only between 1.3 and 1.4 *billion* metric tons of carbon dioxide to comply. *See* 89 Fed. Reg. at 39863.

Petitioners' challenges to EPA's storage conclusions fall short. Petitioners' primary objection, again, is that commercially developed storage is not presently available. Br. 66-67. But present availability does not equate to achievability. *Supra* Argument I.C.

The Rule's determination that sufficient storage can be developed is not mere "optimism" unsupported by the record. *Contra* Br. 67-68. There are thirteen operational storage facilities in the United States, and 44 more projects with 130 injection wells are under review by EPA. 89 Fed. Reg. at 39864-65. Many more sequestration sites will be developed due to the Rule. *See id.* at 39878. The Rule explains that federal policy promotes this development. Storage sites may be considered covered projects under the Fixing America's Surface Transportation ("FAST") Act, a statutory program designed to improve the timeliness, predictability, and transparency of the federal environmental review and authorization process for significant infrastructure projects. *Id.* at 39866 n.514.

Lastly, Petitioners criticize EPA for having issued only eight carbon-dioxide storage permits to date, and they highlight a storage project pre-dating the Rule that took four years to get permitted. Br. 68-69. But Petitioners' criticism ignores critical context. Due to increased incentives for geological storage, EPA has seen a considerable uptick in permit applications in recent years. 89 Fed. Reg. at 39870. EPA received most of the pending applications within the past year and expects to review complete applications and issue permits (when appropriate) within approximately 24 months. *Id.* at 39871. To support this goal, EPA has allocated more resources to its permitting program and continues to work with States seeking authority to issue permits themselves. *Id.* EPA thus reasonably expects to



expeditiously process the pending and future permit applications. In any case, the increased interest in these projects confirms EPA's determination that storage is broadly available. Petitioners cannot reasonably claim both that there are too many of these projects and too few.

**4. EPA reasonably established a January 1, 2032 compliance date for CCS implementation.**

EPA reasonably set a January 1, 2032 deadline for covered sources to start achieving the standards based on 90% CCS. 89 Fed. Reg. at 39874-75 (coal), 39938-39 (gas); Steam Measures 43-49, JA \_\_\_\_ - \_\_\_\_\_. EPA predicated this compliance date on (i) a baseline carbon-capture-plant-project schedule developed by architect engineering firm Sargent & Lundy<sup>19</sup> and a review of carbon-capture projects that have moved more expeditiously (e.g., Boundary Dam and Petra Nova); and (ii) a review of the available information for installation of carbon-dioxide pipelines and storage sites, including a timeline summary developed by expert consultant ICF International. 89 Fed. Reg. at 39874-75, 39938-39. The key

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<sup>19</sup> Sargent & Lundy has extensive expertise in fossil fuel-fired power plants and carbon-capture projects. Steam Measures, Attachment 17 (CO<sub>2</sub> Capture Project Schedule) at 10, JA \_\_\_\_\_. Over the last 16 years, the firm has worked on 146 carbon-capture projects for 85 clients across 12 industries. *Id.*

elements of the compliance timeline for existing coal plants are summarized below.<sup>20</sup>

The timeline starts with feasibility work, consisting of initial conceptual design and other preliminary tasks, which is projected to take less than one year for each CCS component, though the timeline conservatively sets aside June 2024 through June 2025 for such work. *Id.* at 39874. At the same time sources undertake initial feasibility work, States develop their implementation plans, from June 2024 through June 2026. *Id.* Once state plans are submitted to EPA in June 2026, EPA’s timeline assumes that sources will undertake more substantial project work. *Id.*

EPA explained that, of the CCS components, carbon capture is the most “technically involved and time consuming,” and is therefore the primary driver for the compliance date. *Id.* Following feasibility work and the state planning process, EPA determined that covered sources will need about 5.5 years to install and make operational the capture component. *Id.* at 39874-75. While this timeline is slightly faster than Sargent & Lundy’s baseline (by two months), it tracks completed projects (Boundary Dam Unit 3 and Petra Nova) and project schedules

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<sup>20</sup> The timeline for gas plants is similar except it excludes the state planning process because EPA directly implements standards for new sources. 89 Fed. Reg. at 39938-39.

developed in completed Front-End Engineering Design studies.<sup>21</sup> *Id.* Moreover, EPA reasonably expects that newly authorized tax credits and this Rule will encourage expeditious action. *Id.*

EPA’s timeline anticipates that the remaining CCS components—transport and storage—will be installed concurrently with the capture system. *Id.* Following feasibility work and the state planning process, the timeline projects that storage can be permitted and constructed in four years. *Id.* As for pipelines, EPA assumes substantial work lags the start of substantial work on storage by six months. *Id.* At that point, EPA projects three years for final routing, permitting activities, and right-of-way acquisition; and 1.5 years for pipeline construction. *Id.* Thus, pipelines should be complete by June 2031, six months before the compliance date. *Id.*

Petitioners largely fail to grapple with EPA’s thorough and well-reasoned timeline analysis. Br. 70-75. Instead, Petitioners reraise the specter of supply-chain bottlenecks, which EPA has already debunked, *see* 89 Fed. Reg. at 39877-78, and attempt to discredit certain evidence on which EPA relied. For instance, Petitioners argue EPA erred by relying on Sargent & Lundy’s “baseline project

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<sup>21</sup> A Front-End Engineering Design is a preliminary plan that is sufficiently detailed to support the development of a project, including the execution of commercial agreements. Steam Measures, Attachment 17 (CO<sub>2</sub> Capture Project Schedule) at 3, JA \_\_\_\_.

schedule” to set a compliance timeline that applies to all plants. Br. 70. But setting compliance timelines based on a typical high-level schedule—one developed by an expert drawing upon 146 projects—is consummately reasonable. In setting emission guidelines for a category of sources, EPA appropriately is not endeavoring to assess the individualized features and circumstances of all covered sources to set bespoke compliance timelines for each.

Instead of relying on a typical high-level schedule, Petitioners evidently think EPA should have relied on the timeline from a single project: Project Tundra. Br. 71-72. But that project predated the Rule and was not subject to legally binding timing requirements or the currently available tax incentives, and thus its timeline cannot outweigh the more robust dataset on which EPA relied. *See Wisconsin*, 938 F.3d at 330; *Steam Measures* 43-44, JA\_\_\_\_ - \_\_\_\_.

Petitioners also criticize the Sargent & Lundy baseline schedule for “evaluat[ing] the lead time for only *one part* of the CCS system—capture.” Br. 73. But that is the entire point of that document, as evidenced by its title, *see Steam Measures*, Attachment 17 (*CO<sub>2</sub> Capture Project Schedule and Operations* (emphasis added)), JA\_\_\_\_. EPA primarily relied on separate evidence to determine the timelines for pipelines and storage, as Petitioners themselves belatedly acknowledge, Br. 73. Moreover, the timeline for those components is

shorter than, and runs concurrently with, the timeline for capture. 89 Fed. Reg. at 39874-75.

Next, Petitioners contend EPA erred by not assuming CCS projects are, in general, subject to the National Environmental Policy Act (“NEPA”). Br. 73-74; *see also id.* at 73 (criticizing ICF “Transport and Storage Timeline Summary” for similar reason). But EPA’s premise is reasonable; NEPA review is triggered only by projects including “major Federal actions significantly affecting the quality of the human environment.” *Food & Water Watch, Inc. v. FERC*, 104 F.4th 336, 341 (D.C. Cir. 2024) (quoting 42 U.S.C. § 4332(C)). Not all CCS projects will involve major federal actions. *See* 89 Fed. Reg. at 39859, 39875. For those that will, the preamble explained that the “timeline ... accommodate[s] ... NEPA” review so that Rule compliance by January 1, 2032, is still feasible. *See id.* at 39875 (explaining NEPA review can be finalized concurrently with other aspects of project development). If, however, more time is needed for a particular project to comply with NEPA than EPA’s timeline allows, that can be addressed through the state planning and standard-setting process, with the State able to provide an extended deadline. *Id.* at 39836.

**D. EPA reasonably considered the costs of 90% CCS.**

EPA reasonably determined that long-term existing coal plants and new baseload gas plants can implement CCS without incurring excessive costs. In so

concluding, EPA appropriately considered the ability of sources to take advantage of the expanded tax incentives in the Inflation Reduction Act. EPA's approach to costs reflects the best understanding of Congress's direction in Section 7411 and respects Congress's policy judgment in exercising its taxation power.

**1. CCS is cost-reasonable for long-term coal plants and baseload gas plants.**

Section 7411(a)(1) requires EPA, in identifying the best system of emission reduction that is "adequately demonstrated" for sources, to consider the "cost of achieving such reduction," along with "any nonair quality health and environmental impact and energy requirements." 42 U.S.C. § 7411(a)(1). This Court has stated that EPA's identification of the best system "will be sustained" unless the costs of using the technology are "unreasonable." *Lignite Energy Council*, 198 F.3d at 934.

Section 7411(a)(1) does not prescribe any specific cost-assessment methods or dictate the weight that should be assigned to listed factors. Accordingly, EPA has considerable discretion to exercise policy judgment in deciding how to account for costs and to balance them against other factors. *See Loper Bright*, 144 S. Ct. at 2263 (holding that statutes may empower agencies to regulate subject to the limits imposed by terms or phrases that leave agencies with flexibility); *Lignite Energy Council*, 198 F.3d at 933 (EPA has "a great degree of discretion in balancing"

Section 7411(a)(1) factors); *cf. Michigan v. EPA*, 576 U.S. 743, 759 (2015) (explaining that it will be up to EPA to decide “how to account for cost”).

In the Rule, EPA carefully assessed the costs to sources of implementing 90% CCS. Applying multiple evaluative metrics, EPA appropriately determined that costs will be reasonable for long-term existing coal plants and new baseload gas plants. 89 Fed. Reg. at 39879-83, 39932-35. In so concluding, EPA acknowledged that it had previously viewed 90% CCS as too costly. *Id.* at 39898. EPA explained, however, that two consequential factual developments had occurred since it last considered the issue. *Id.* First, technological advances, including “[p]rocess improvements learned from earlier deployments” and “the availability of better solvents,” had significantly decreased CCS costs. *Id.* at 39813-14, 39882.<sup>22</sup> Second, Congress in 2022 had substantially increased the tax credit for power plants that employ CCS, to \$85 per metric ton of carbon sequestered. *See id.* at 39880-81 (citing 26 U.S.C. § 45Q). That expanded credit now “offsets a significant portion” of CCS costs. *Id.* at 39881.

Accounting for these developments, EPA newly evaluated the costs associated with implementing each CCS component, along with the effect of the

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<sup>22</sup> The 2019 Rule relied on a 2015 National Energy Technology Laboratory report estimating the incremental levelized costs of CCS at a new coal facility to be \$74-per-megawatt-hour. A 2022 Laboratory report lowered that estimate to \$44-per-megawatt-hour generation. 89 Fed. Reg. at 39882.

expanded tax credit. *Id.* at 39879-83, 39932-35. EPA then applied the same sort of metrics that it has traditionally used for assessing the cost-reasonableness of rules affecting the power sector. The two principal metrics involved (1) the change in the cost to sources of producing electricity due to controls, measured in dollars-per-megawatt-hour, and (2) the cost to sources associated with removing a ton of pollutant. *Id.* at 39879, 39934-35. EPA additionally examined how total annual source compliance costs compared to past rules for the power sector and to the industry's annual revenues and capital expenditures. *Id.* at 39880, 39935.

These metrics supported EPA's conclusion that CCS costs would be reasonable for sources within two subcategories. For long-term existing coal plants, EPA reasonably determined that such plants would be incentivized to run at full capacity and for a duration to maximize their Section 45Q tax gains, and as a result, the average annual tax credit would be so substantial that it would render generating electricity *less expensive* for these plants than it would be absent investing in the technology. *See id.* at 39879; RTC, Ch. 2 at 38-39, JA\_\_\_\_ - \_\_\_\_; Steam Measures 53, JA\_\_\_\_. More specifically, EPA projected that by maximizing tax benefits, the average coal plant installing CCS secures an additional \$4 in revenue per megawatt hour of generation, or an additional \$5 in revenue per ton of carbon-dioxide emissions avoided. 89 Fed. Reg. at 39879. Thus, not only would the specified degree of carbon emission reduction be



achievable for such plants, but the installation of CCS would result in an overall economic benefit to them. *Id.*

These metrics therefore compared favorably (and rather obviously so) to past Clean Air Act rules for the power sector and to greenhouse-gas rules for other industries. *Id.* at 39879, 39882. Reinforcing the reasonableness of the costs, EPA’s modeling projects that some coal plants are expected to install CCS to take advantage of the tax credit even in the absence of any regulation. *Id.* at 39882.

EPA applied similar metrics to evaluate the costs for new baseload gas plants. And EPA projected that where tax benefits are maximized, the costs of controls for these plants compare favorably to costs in other EPA rules and are reasonable. *Id.* at 39882, 39932, 39935; Greenhouse Gas Mitigation Measures for Combustion Turbines (“Gas Measures”) 11-17, EPA-HQ-OAR-2023-0072-9099, JA\_\_\_\_ - \_\_\_\_.

Notably, however, EPA did not believe that costs would be reasonable for *all* categories of plants, and EPA responded accordingly. EPA identified CCS as the best system only for the longest-running coal plants (long-term plants) and the most-used gas plants (baseload plants), based on EPA’s finding that those plants will run long enough and at a sufficient capacity to render the achievement of the standards cost-reasonable. *See* 89 Fed. Reg. at 39841, 39923. Thus, EPA created

appropriate subcategories of plants and selected CCS as the best system only for those plants where CCS will be suitably cost-reasonable.

**2. EPA appropriately respected Congress’s decision to facilitate CCS implementation through tax credits.**

Petitioners contest one element of EPA’s cost analysis: EPA’s consideration of the availability of the expanded Section 45Q tax credit.<sup>23</sup> But EPA did not err in considering this credit.

As an initial matter, Section 7411(a)(1) directs EPA to consider, not “cost” in general, but “the cost of *achieving such reduction*.” 42 U.S.C. § 7411(a)(1) (emphasis added). The term “such reduction,” in turn, refers to the reduction “achiev[ed] through the application of the best system of emission reduction.” *Id.* Because it is sources that apply the best system, the phrase “cost of achieving such reduction” is naturally and best read as being focused on the costs to regulated sources (costs which can be passed along to ratepayers).<sup>24</sup>

That EPA was right to focus its cost assessment here on the costs to sources who will be implementing controls is especially clear considering that Congress

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<sup>23</sup> Petitioners do not otherwise contest the metrics EPA applied and have forfeited any additional arguments contesting EPA’s cost assessment.

<sup>24</sup> Because higher costs to ratepayers directly flow from control costs incurred by sources, EPA does consider ratepayer costs to be within the ambit of costs that EPA may consider under Section 7411(a)(1), and EPA has never suggested otherwise. *See* 89 Fed. Reg. at 39880 (addressing Rule’s effects on electricity prices). *Contra* Pet. Br. 82-84.

has elected through its taxation power to subsidize those costs. 89 Fed. Reg. 39881. The tax incentives provided by Congress are intended to reduce, and do reduce, the costs that sources will incur implementing CCS. These tax incentives were clearly an important aspect of the problem before EPA, and EPA did not err in incorporating them into its cost assessment.

In contending that EPA should have used a different analytical approach that favored preserving taxpayer resources at the expense of emission reduction, Petitioners not only misconstrue Section 7411(a)(1), but demand that EPA second-guess the policy judgments Congress has already made through the exercise of its taxation power. Here, Congress has determined that it is a worthwhile use of taxpayers' resources, and in the public interest, to subsidize and facilitate the installation of CCS. The tax incentives provided by Congress, by their very nature, are intended to encourage recipients to use them. Accordingly, EPA's cost assessment did not go astray by respecting that Congressional policy judgment, particularly when the principal objective of Section 7411 is emission reduction.

And to the extent there were any doubt as to whether EPA's approach comports with what Congress intended, Congress dispelled it in the Inflation Reduction Act. Therein, Congress appropriated substantial new funding to EPA and directed EPA to use that funding to "ensure that reductions in greenhouse gas emissions are achieved" from the power sector "through use of [EPA's] existing

authorities” (which include Section 7411). 42 U.S.C. § 7435(a)(6). Congress then directed EPA to ensure that the reductions achieved through Section 7411 authority “incorporat[e]” the findings of a required “assessment” of reductions that will result from “changes in domestic electricity generation and use that are anticipated to occur on an annual basis through fiscal year 2031” (i.e., including the anticipated reductions that would result through application of the incentives and tax credits in the Act). *Id.* § 7435(a)(5)-(6). This combination of directives reflects Congress’s expectation that EPA would account for the effect of the expanded tax credits as part of its standard-setting analysis.

Underscoring this, the available Inflation Reduction Act legislative history anticipates and categorically rejects Petitioners’ precise legal argument. As the Chairman of the House Committee on Energy and Commerce, which drafted the statute’s environmental provisions, explained in a statement:

Congress intends for all of the technologies funded under this Act (such as the tax credits for [CCS] ... ) to be available to EPA to tackle the climate crisis[.] ... [W]e urge EPA, where feasible, to base its emissions requirement on ... technologies that are available ... because of incentives contained within this Act. ...

The tax credits for [CCS] ... included in this Act may also figure into [Clean Air Act] Section [7411] [greenhouse-gas] regulations for new and existing industrial sources as well as other [Clean Air Act] requirements ... . Congress anticipates that EPA may consider [CCS] ... as [a] candidate[] for [best system[] of emission reduction] for [coal and gas plants].... Further, Congress anticipates that EPA may consider the impact of the [CCS] ... tax credits in lowering the costs of those measures.

168 Cong. Rec. E879 (Aug. 26, 2022) (statement of Rep. Pallone); *see also* Pallone Comments, EPA-HQ-OAR-2023-0072-3519, JA\_\_\_\_.

Petitioners have no response to this highly probative legislative history other than to try to wave it away as the statement of a sole legislator. Br. 86-87. But the statement is not from a backbencher; it is from the chairperson of the committee that crafted Section 7435. And because the Inflation Reduction Act was passed under reconciliation legislation procedures, there are no committee reports, and the Chairman’s statement is therefore the best source of legislative history available. RTC, Ch. 2 at 140-41, n.195, JA\_\_\_\_ - \_\_\_\_.<sup>25</sup>

Even if that legislative history were disregarded, Petitioners still fail to demonstrate that their preferred approach to cost-accounting was statutorily compelled, or that EPA’s approach was arbitrary. To the contrary, EPA’s approach reflects the best reading of “cost of achieving such reduction,” and EPA appropriately respected Congress’s taxation policy judgment. And because EPA’s approach to costs was a reasonable exercise of discretion, this Court can uphold the

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<sup>25</sup> Petitioners posit a far-fetched hypothetical where Congress would subsidize emission reductions costing more than “\$2 trillion every year.” Br. 85. Even if there could be some question as to Congress’ intent under that implausible hypothetical—contemplating tax credits amounting to a sizable percentage of the entire annual federal budget and enormously greater than those at issue—no such question is presented here.

Rule without identifying the outer boundaries of what “costs” can be permissibly considered under Section 7411(a)(1).<sup>26</sup>

In short, the purpose of the expanded tax credit was to render economically feasible, and thereby facilitate, use of a technology that benefits the public by reducing greenhouse-gas emissions and their attendant harmful climate-related effects. And EPA properly considered the tax credit in determining that the costs of CCS do not exceed the benefits to the public. *See* RTC, Ch. 2 at 12-15, JA\_\_\_\_-\_\_\_\_ (concluding based on the totality of the circumstances that the advantages of the rule outweigh the disadvantages).<sup>27</sup>

Beyond their general objection to EPA’s consideration of the tax credits, Petitioners suggest more specifically that EPA should have differently accounted for the fact that tax credits are available for a 12-year period and are scheduled to expire in the mid-2040s. Br. 85-86. EPA, however, reasonably considered and addressed this aspect of the problem as well. While EPA’s analysis assumed the

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<sup>26</sup> Petitioners point to EPA’s observation that tax credits are often funded through borrowing so that taxpayer burdens are deferred. Br. 88 (citing RTC, Ch. 2 at 129, JA\_\_\_\_). That observation should not be read to suggest that adding to the national debt does not burden the public fisc. In any event, regardless of how tax credits are funded, EPA reasonably deferred to Congress’ taxation policy judgment.

<sup>27</sup> Notably, although EPA did not rely on a formal cost-benefit analysis, it did prepare one, and that analysis projects that the Rule’s net benefits are over \$300 billion. *See* 89 Fed. Reg. at 40004-09; Regulatory Impact Analysis (“RIA”) Executive Summary, EPA-HQ-OAR-2023-0072-8913, JA\_\_\_\_-\_\_\_\_.

capital costs of CCS would be amortized during the 12 years the tax credit is in force, EPA acknowledged that after the expiration of the tax credit, sources could potentially face higher costs if they are not able to replace the revenue from the tax credit with revenue from other sources. But to avoid any possibility that sources would have to comply with standards based on a system that was no longer cost-reasonable, EPA made a regulatory commitment to review, and if appropriate, revise the rule by January 1, 2041. 89 Fed. Reg. at 39902, 40056; 40 C.F.R. § 60.5795b. Completing a review and any appropriate revisions by this date will allow ample time for States to revise, if necessary, standards for existing coal plants, and for EPA to act on those state revisions by the mid-2040s.

EPA did note, however, its expectation that significant economic and regulatory developments may occur between now and 2041, which may well improve the economics of CCS even further, should the tax credit not be extended by Congress. For example, because the demand for carbon dioxide is expected to grow considerably over coming decades, “sources may well be able to replace at least some of the revenues from the tax credit with revenues from the sale of [carbon dioxide].” 89 Fed. Reg. at 39902. In addition, there are expected to be technological developments that lower costs. *Id*; *see also* RTC, Ch. 2 at 48-54, JA \_\_\_\_ - \_\_\_\_\_. But apart from these anticipated developments, EPA reasonably determined that the tax credit is “generally sufficient to defray the capital costs of

CCS and much, if not all, of the operating costs during” the 12-year period while the tax credit is in place, and therefore, CCS is still cost-reasonable at this time. 89 Fed. Reg. at 39902.

**3. Intervenor’s cost arguments should not be considered and lack merit.**

**a. Intervenor cannot raise new arguments and lack standing.**

The two Intervenor for Petitioners raise assorted cost-focused arguments beyond those advanced by Petitioners. But under this Court’s longstanding precedent, Intervenor “may only argue issues that have been raised by the principal parties.” *Am. Fuel & Petrochemical Mfrs. v. EPA*, 937 F.3d 559, 590 (D.C. Cir. 2019) (cleaned up). When Intervenor declined to file their own timely petitions, they “forfeited any guarantee to judicial review of [their] claim.” *Id.* And Intervenor have failed to allege, let alone establish, any “extraordinary” reason for considering their intervenor-only arguments notwithstanding this Court’s “general rule,” nor any “excuse” for their failure to petition themselves. *Id.* (cleaned up). The Court should, accordingly, disregard the Intervenor-only arguments.

The two Intervenor additionally lack Article III standing. To demonstrate Article III standing, parties bear the burden to demonstrate an injury in fact that is “concrete and particularized,” traceable to the defendant’s conduct, and “likely”



redressable by an order against defendants. *See Lujan v. Defs. of Wildlife*, 504 U.S. 555, 560-61 (1992). Intervenor failed to meet this burden. They did not submit affidavits or other evidence showing specific injuries to themselves, or in the case of the Tennessee Valley Public Power Association (“the Association”) to its members, that would be redressable, either with their motion to intervene or with their opening brief. *Nat’l Ass’n of Regul. Util. Comm’rs v. FCC*, 851 F.3d 1324, 1327 (D.C. Cir. 2017) (“[W]here ... standing is not self-evident, the [party] in its opening brief must support each element of its claim to standing by affidavit or other evidence.” (internal quotation marks omitted)).

Intervenor’s standing is not self-evident. The Association claims solely that its members will be injured by increased costs and reduced reliability of power supplied by the Tennessee Valley Authority. Int. Br. 5; Association Mot. to Intervene 3-4. But that purported injury relies solely on conjecture as to how the regulated Authority will react to the Rule. *See Lujan*, 504 U.S. at 560 (injury-in-fact cannot be “conjectural” or “hypothetical”).

The standing of Intervenor Louisiana Public Service Commission (“the Commission”) likewise is not self-evident. There is no evident injury to the Commission’s organizational interests because the Rule—which primarily sets emissions limitations for covered sources—does not “perceptibly impair[]” the Commission’s “ability to provide services.” *Turlock Irrigation Dist. v. FERC*, 786

F.3d 18, 24 (D.C. Cir. 2015); *see also Food & Water Watch, Inc. v. Vilsack*, 808 F.3d 905, 919 (D.C. Cir. 2015) (an organization must show “the agency’s action ... injured the organization’s interest” and that it “used its resources to counteract that harm”). The Commission is free to continue performing its regulatory functions, regardless of the Rule. And to the extent the Commission asserts associational standing, the Commission—which has no members and has a broad regulatory purview, Association Mot. to Intervene at 3—is not “the functional equivalent of a traditional membership organization.” *See Fund Democracy, LLC v. S.E.C.*, 278 F.3d 21, 25-26 (D.C. Cir. 2002).

**b. Intervenor’s cost arguments lack merit.**

Intervenors’ arguments should be rejected if considered. Intervenors argue: (1) that EPA erred in assuming that plants installing CCS would operate at an 80% capacity factor to maximize tax credits during the period of credit eligibility, Int. Br. 13-18; (2) that EPA did not sufficiently consider certain issues related to the monetization of tax credits, Int. Br. 18-22; (3) that EPA failed to explain why the costs of CCS for new baseload gas plants are reasonable, Int. Br. 16; and (4) that EPA’s reasoning is internally inconsistent, Int. Br. 24. These arguments all fail.

*Capacity Factors:* Record evidence supports EPA’s assumption that coal and gas plants with CCS will run at an 80% capacity factor to maximize tax benefits during the period the tax credit is in effect. 89 Fed. Reg. at 39934. To

begin, EPA reasonably observed that sources installing CCS “will have a strong economic incentive to increase utilization and run at higher capacity factors than occurred historically” to maximize tax benefits. *Id.* at 39879. That economic incentive exists because the more a plant with CCS runs, the more carbon dioxide it can capture and sequester, and the greater the resulting tax credit.

To assess the specific degree to which tax credits would likely affect capacity factors, EPA reasonably looked to the Integrated Planning Model. *See infra* Argument I.E.1 (explaining Model). That model projected that with CCS and the tax credits, new baseload gas plants and long-term existing coal plants will run at capacity factors of 87% and about 80%, respectively. Steam Measures 53, JA\_\_\_\_. EPA’s 80%-capacity-factor assumption was thus well-grounded in the record, and conservative with respect to gas plants. 89 Fed. Reg. at 39934. As EPA further noted, the Department of Energy’s National Energy Technology Laboratory independently assumed within its “Baseline” study that CCS plants would run at an even higher 85% capacity factor. 89 Fed. Reg. at 39934; Cost and Performance Baseline 8-9, EPA-HQ-OAR-2023-0072-8897, JA\_\_\_\_ - \_\_\_\_.

Intervenors claim that the 80% assumption may be “unrealistic” for some gas plants because utilities dispatch resources (i.e., call upon resources to produce power) in economic order, and renewable and nuclear resources will dispatch before resources with CCS. Int. Br. 14, 16. But EPA did not overlook that plants

with lower operating costs dispatch first. As EPA explained, “when factoring in the 45Q tax credits, the variable cost of operating a unit with CCS (considering fuel costs, operating costs, and revenue from carbon sequestration), are lower than the variable operating costs of a unit without CCS.” Gas Measures 5, JA\_\_\_\_.

“This means that the unit will be lower on the dispatch curve and will operate more.” *Id.*<sup>28</sup> In other words, while renewable and nuclear resources (which generally have lower operating costs than fossil fuel-fired generation) might dispatch before any gas plants, those gas plants with CCS will be better positioned in the dispatch order than they would be without CCS. Moreover, EPA’s modeling projects that they will operate at capacity factors above 80% to meet the remaining demand.

*Monetizing Tax Credits:* Intervenors’ assorted arguments, Int. Br. 18-22, related to sources’ ability to monetize tax credits are also unavailing. As Intervenors acknowledge, even utilities that are in net operating loss positions, or who otherwise owe no taxes, may take advantage of the tax credits. Certain tax-exempt entities, such as rural electric cooperatives, may monetize the credits

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<sup>28</sup> Intervenors claim that gas plants will be unable to successfully sequester carbon to the degree required, and so will not receive the tax credits to the degree EPA assumed. Int. Br. 16-17. They also claim that the Rule “force[es] natural gas units to run at below-normal levels,” or requires utilities “to construct more” units. Int. Br. 17-18. But these claims just restate Petitioners’ meritless objections to EPA’s determinations that 90% CCS is adequately demonstrated and the associated standard is achievable. *Supra* Argument I.B.2-3, I.C.

directly as cash refunds. 89 Fed. Reg. at 39819; 26 U.S.C. § 6417(a), (d)(1)(A)(vi). Tax-paying entities may elect to have direct payment of credits for five years, 26 U.S.C. § 6417(a), (d)(3)(C)(i)(II)(aa), and subsequently may monetize unused credits by selling them to other taxpayers, *id.* at § 6418(a), (f)(2).

Intervenors contend that EPA did not “estimate the extent to which the sale costs” of transferred tax credits “will have to be discounted.” Int. Br. 19. But EPA did. RTC, Ch. 4 at 101-02 & n. 17, JA\_\_\_\_-\_\_\_\_. EPA found that any discounting would likely “apply to only a subset of affected sources” and that its effects are “likely to be modest, unlikely to exceed between 5% and 10% of the overall value of the 45Q tax credit, conservatively estimated,” and could be offset by additional federal funding not accounted for in EPA’s analysis. *Id.*

Intervenors further contend that the Rule does not protect ratepayers sufficiently where a source owner monetizes a tax credit by selling it to third parties, or where a utility maintains unused tax credits and includes their value in its rate base as an accumulated deferred income tax. Int. Br. 18-19. These arguments were not raised in public comments and were therefore forfeited. 42 U.S.C. § 7607(d)(7)(B). Regardless, EPA’s cost metrics and analysis reasonably focused on assessing the overall level of costs associated with sources’

implementation of CCS, not speculation regarding the degree to which a particular firm might have excess tax credits in a particular year.<sup>29</sup>

*New Baseload Gas Plants:* Contrary to Intervenor’s argument, Int. Br. 16, EPA did quantify compliance costs for new baseload gas plants and explained why it regarded CCS costs to be reasonable. 89 Fed. Reg. at 39882, 39932, 39935; Steam Measures 11-17, JA\_\_\_\_ - \_\_\_\_\_. EPA compared quantified CCS costs for new baseload gas plants to control costs required in other EPA rules for the power industry, as well as the costs in other rules limiting greenhouse gases. *Id.* Those comparisons reflected that the CCS costs for new baseload gas plants “are generally lower than the costs of other controls” for power plants, as well as lower than “the costs of other controls for greenhouse gases” in other industries. 89 Fed. Reg. at 39935.<sup>30</sup> Intervenor’s do not contest EPA’s cost metrics or how they were applied.

*Internal Consistency:* Intervenor’s are incorrect in claiming internal inconsistency. Int. Br. 24-25. In observing that the Section 45Q tax credit may not

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<sup>29</sup> EPA did generally assess the impacts of the Rule on ratepayers, and found them minimal, with projected annual national electricity increases peaking at a 1% increase from baseline levels in the 2035 modeled year. RTC, Ch. 2 at 147, JA\_\_\_\_; RIA 3-33 to 3-37, JA\_\_\_\_ - \_\_\_\_.

<sup>30</sup> Intervenor’s incorrectly assert, Int. Br. 16, (1) that EPA “never discloses” the cost of CCS without the tax credits, and (2) that CCS will “triple” the cost of running baseload plants. *See, e.g.*, Gas Measures 12 (Fig. 7) (disclosing cost of CCS without tax credits and reflecting no such degree of increase), JA\_\_\_\_.

be available to defray the costs of CCS at low capture rates, 89 Fed. Reg. at 39846, EPA was not commenting on sources' ability to install 90% CCS and operate at an 80% capacity factor. EPA was simply noting that under the terms of the tax credit, sources may not be available to defray all CCS costs at low capture rates, making partial CCS a less attractive option from a cost-reasonableness perspective. *Id.* at 39887.

Finally, Intervenor's discussion of the recent experience of Cleco should be disregarded because it goes beyond the administrative record and is based on post-Rule developments. *See* Int. Br. 26 (relying on document that postdated the Rule); 42 U.S.C. § 7607(d)(7)(A). Intervenor also point to nothing in the cited report that forecloses Cleco's ability to install 90% CCS and recover tax credits.

**E. EPA reasonably considered grid reliability.**

Petitioners' reliability arguments hinge on a false premise. Petitioners argue that the Rule imposes unachievable CCS-based requirements that will force coal-plant retirements and hinder new gas-plant construction, thus undermining the reliability of the electric grid. Br. 90, 96, 98. But 90% CCS is adequately demonstrated, and the resulting standards are achievable. *Supra* Argument I.B-D. If the Court upholds those conclusions, then Petitioners' reliability arguments also give way.

In any case, EPA acknowledged that it must consider reliability when evaluating “energy requirements.” 42 U.S.C. § 7411(a)(1); RTC, Ch. 2 at 91-92, JA\_\_\_\_-\_\_\_\_. EPA did so throughout the Rule’s preamble and in technical record documents. 89 Fed. Reg. at 39803, 39886, 39895, 39937, 39971-73, 40011-20; RTC, Ch. 16 at 14-158, JA\_\_\_\_-\_\_\_\_; Resource Adequacy Analysis Technical Support Document (“Resource Adequacy”), EPA-HQ-OAR-2023-0072-8916, JA\_\_\_\_-\_\_\_\_; Resource Adequacy Analysis: Vehicle Rules, Final 111 EGU Rules, ELG and MATS RTR (“Cumulative-Impacts Memo”), EPA-HQ-OAR-2023-0072-8915, JA\_\_\_\_-\_\_\_\_; IPM Sensitivity Runs Memo (“Sensitivity Runs”), EPA-HQ-OAR-2023-0072-8917 JA\_\_\_\_-\_\_\_\_; Trends, JA\_\_\_\_-\_\_\_\_; RIA 3-20 to 3-32, JA\_\_\_\_-\_\_\_\_.

That extensive record shows that the Rule will have only incremental effects on the power sector and that reliability can be maintained through ongoing planning efforts. Petitioners’ challenges to EPA’s reliability modeling are meritless. EPA also designed the Rule to allow grid planners to continue ongoing planning efforts to maintain reliability, and EPA added reliability safeguards at commenters’ request.

**1. EPA thoroughly assessed the Rule’s potential effects on the power sector.**

Section 7411(a)(1) does not dictate how EPA must assess “energy requirements,” leaving EPA with discretion. *Supra* Argument I.D.1 (explaining



EPA's discretion over how to consider and weigh § 7411(a)(1) factors). EPA reasonably chose to assess energy requirements through power-sector modeling.

To assess the Rule's potential effects, EPA used the Integrated Planning Model: a peer-reviewed model of the U.S. power sector, which is also routinely used by other government agencies and by industry, that simulates market responses to various scenarios based on the best available information, including from utilities and industry experts. RIA 3-7 to 3-10, JA\_\_\_\_ - \_\_\_\_; IPM Documentation, Ch. 1 at 1-9 to 1-11, EPA-HQ-OAR-2023-0072-8396, JA\_\_\_\_ - \_\_\_\_\_. EPA used the Model to compare a scenario with the Rule against a baseline scenario without the Rule, thereby projecting the Rule's potential effects.

Modeling projected that the Rule will have only incremental effects on the power sector and will not disrupt reliability. Even without this Rule, most existing coal plants are projected to retire in the coming years. 89 Fed. Reg. at 39822; Trends 23-25, JA\_\_\_\_ - \_\_\_\_; RIA 3-27 to 3-30, JA\_\_\_\_ - \_\_\_\_\_. EPA projected that this Rule will result in only incremental additional coal-plant retirements beyond that baseline. RIA 3-27 to 3-32, JA\_\_\_\_ - \_\_\_\_\_.<sup>31</sup> The modeling also projects only

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<sup>31</sup> Petitioners are wrong, Br. 94, that the Energy Information Administration predicted that the Rule will force 155 gigawatts' worth of coal-plant retirements. Petitioners cite a comment that itself cited the Administration's inventory of existing and planned generators. That inventory is not predictive. *See* Energy Info. Admin, Preliminary Monthly Electric Generator Inventory, <https://www.eia.gov/electricity/data/eia860m> (cited inventory). Petitioners appear to assert that all coal plants without announced retirement dates in the inventory

small effects on new gas-plant additions relative to baseline, with baseload gas generation declining significantly under both the baseline and Rule scenarios. *Id.*; 89 Fed. Reg. at 39823.

EPA reasonably concluded that the power sector can adjust to the Rule's incremental effects while maintaining reliability. 89 Fed. Reg. at 39803, 40013. The Model projected that the incremental coal-plant retirements expected to result from the Rule can be offset by gas, renewables, and energy-storage capacity while meeting reliability requirements. Resource Adequacy 8-9, JA\_\_\_\_ - \_\_\_\_; 89 Fed. Reg. at 39803. In reaching its conclusion, EPA considered the effect of this Rule alongside other power-sector rules, as well as possible increases in electricity demand. Cumulative-Impacts Memo, JA\_\_\_\_ - \_\_\_\_; Sensitivity Runs 27-50, JA\_\_\_\_ - \_\_\_\_\_. EPA found that even with those considerations, the Rule would not interfere with reliability requirements. Cumulative-Impacts Memo 3, JA\_\_\_\_; Sensitivity Runs 28, 40, JA\_\_\_\_, \_\_\_\_\_. EPA's record explanations refute the accusations, Br. 95, 100, that EPA failed to explain its projections and to analyze the cumulative effects of other power-sector rules.

EPA's modeling projections make sense given existing sector trends. Independent of this Rule, coal generation has been steadily declining and was

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will retire by 2032 because of this Rule—and to misleadingly attribute this assertion to the Administration.

recently surpassed by renewables. 89 Fed. Reg. at 39816-17; Trends 5 & n.5, JA\_\_\_\_. Rapid decreases in the cost of renewables, increased demand for decarbonized energy, clean-energy incentives, and state and industry emission-reduction commitments have accelerated the trend. 89 Fed. Reg. at 39816-22; Trends 7-18, JA\_\_\_\_ - \_\_\_\_\_. More than half of coal plants have already announced plans to retire or convert to gas by 2039, and more retirements are expected based on the age and economics of remaining plants. 89 Fed. Reg. at 39817-19, 39876; Trends 20-25, JA\_\_\_\_ - \_\_\_\_\_.

Independent of this Rule, States and utilities are already making plans for reliable power that account for these trends. 89 Fed. Reg. at 39820, 39937, 40013; Trends 9-18, JA\_\_\_\_ - \_\_\_\_\_. State public-utility commissioners have explained that this planning will ensure reliability even while state decarbonization policies and market changes reshape the energy mix. RTC, Ch. 16 at 45, JA\_\_\_\_; State Perspectives on Power Sector Changes, EPA-HQ-OAR-2023-0072-8940, JA\_\_\_\_ - \_\_\_\_\_. Many plans rely on a “portfolio” approach that combines diverse generation sources, energy storage, grid improvements, and demand-side strategies. RTC, Ch. 16 at 21, JA\_\_\_\_; Future of Resource Adequacy 3-4, 7, 10-12, EPA-HQ-OAR-2023-0072-8581, JA\_\_\_\_ - \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_ - \_\_\_\_\_. Various studies, including by grid planners, have concluded that a portfolio approach makes a clean-energy transition possible while maintaining reliability. FERC, 2023 Reliability Technical

Conference Transcript 202-03, EPA-HQ-OAR-2023-0072-9090, JA\_\_\_\_-\_\_\_\_.

EPA reasonably concluded, based on Model projections and its review of existing planning efforts, that the Rule will not threaten grid reliability.

**2. EPA’s technical approach to modeling was not arbitrary or capricious.**

Petitioners attempt various challenges to EPA’s modeling, but they misunderstand and mischaracterize that modeling. EPA adequately explained the Model, and the Court should not second-guess EPA’s technical judgments.

“[C]ourts routinely defer to agency modeling of complex phenomena,” so long as model assumptions “have a ‘rational relationship’ to the real world.” *Appalachian Power Co. v. EPA*, 249 F.3d 1032, 1053 (D.C. Cir. 2001). That is because the technical nature of modeling “does not easily lend itself to judicial review,” *Appalachian Power Co. v. EPA*, 135 F.3d 791, 802 (D.C. Cir. 1998), and because the fact that models do not make perfect predictions “is inherent in the enterprise of prediction,” *EME Homer City Generation, L.P. v. EPA*, 795 F.3d 118, 135 (D.C. Cir. 2015).

Power-sector modeling is well within EPA’s expertise. *Contra* Br. 99-100; Int. Br. 34. Congress directed EPA to consider “energy requirements,” 42 U.S.C. § 7411(a)(1), and courts defer to EPA’s reasonable projections of “matters over which Congress has given it authority,” *Appalachian Power Co. v. EPA*, 251 F.3d 1026, 1037 (D.C. Cir. 2001). EPA has been using the Model for almost three

decades, including in prior successfully implemented rulemakings. RIA 3-7 to 3-10, JA \_\_\_\_ - \_\_\_\_\_. This Court has previously upheld EPA's reliance on the Model. *E.g., West Virginia v. EPA*, 362 F.3d 861, 870-71 (D.C. Cir. 2004); *Appalachian Power*, 135 F.3d at 814-15.

EPA thoroughly explained the Model's technical approach. The Model incorporates real-world considerations related to projected electricity demand, the full range of generation options (new and existing; fossil-fuel and non-fossil-fuel), and operating and regulatory constraints (including emission limits and transmission capabilities). IPM Documentation, Ch. 2 at 2-1 to 2-5, 2-12 to 2-13, JA \_\_\_\_ - \_\_\_\_, \_\_\_\_ - \_\_\_\_\_. The Model considers reserve margin constraints, which reflect system-reliability requirements based on information from reliability authorities. *Id.* at 2-4, Ch. 3 at 3-15, JA \_\_\_\_, \_\_\_\_\_. It also considers the need for an appropriate mix of energy resources to support reliability. *Id.* Ch. 3 at 3-16 to 3-17, JA \_\_\_\_ - \_\_\_\_\_.

The Model reflects real-world constraints on energy resources. It considers historical weather data that ensures that renewable dispatch aligns with observed data. *Id.* Ch. 2 at 2-7 to 2-10, Ch. 3 at 3-8, 3-13, Ch. 4 at 4-25 to 4-28, JA \_\_\_\_ - \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_ - \_\_\_\_\_. The Model also considers how scarcity of labor and materials affects new capacity additions, resulting in projected build patterns

consistent with historic trends. RTC, Ch. 14 at 26, JA\_\_\_\_; IPM Documentation, Ch. 4 at 4-20, JA\_\_\_\_.

EPA appropriately recognized the Model's limitations. EPA identified specific areas of uncertainty and explained why they "do not change EPA's overall confidence" about the Rule's effects. RIA 3-38 to 3-41, JA\_\_\_\_ - \_\_\_\_\_. The Court should defer to EPA on its highly technical and complex modeling.

Petitioners' modeling challenges lack merit. *First*, Petitioners argue that EPA's modeling considered only resource adequacy and cannot support a conclusion about the Rule's effects on reliability. Br. 98-99. Petitioners mischaracterize the relationship between resource adequacy and reliability. Reliability comprises two primary elements: reliable operation and resource adequacy. FERC, Reliability Explainer 2, EPA-HQ-OAR-2023-0072-8635, JA\_\_\_\_. Reliable operation is about whether the "day-to-day operations of the grid" can withstand sudden disturbances. *Id.* Resource adequacy takes a more macro-level view of the mix of generation resources needed to meet demand. *Id.*

EPA's modeling focused on resource adequacy because that is the aspect of reliability that the Rule most directly affects. *See* Resource Adequacy 2, JA\_\_\_\_. The Model is well-suited to understanding the effects of environmental regulations on electricity generation and capacity. Dep't of Energy, Power Sector Modeling 101 at 12-13, EPA-HQ-OAR-2023-0072-8649, JA\_\_\_\_ - \_\_\_\_\_. Although other

types of models are better suited for detailed chronological analysis, those models are ill-suited for the question at hand: how this country's power sector will meet future demand as this Rule is implemented over the course of years. *Id.* at 19-24, JA\_\_\_\_-\_\_\_\_; FERC Conference 214-15, JA\_\_\_\_-\_\_\_\_ (acknowledging that EPA could not realistically model “granular,” “location specific reliability issues”); Analysis Group, Electric System Reliability and EPA Regulation 35-36, EPA-HQ-OAR-2023-0072-8582 JA\_\_\_\_ (explaining that operational-reliability modeling would have been “unrealistic” since it depends on “specific future compliance decisions” of power plants across the country a decade from now). And EPA's resource-adequacy analysis nonetheless bears on reliable operation because having an adequate resource mix that meets reserve-margin requirements is key to ensuring that grid operations can withstand disturbances.

*Second*, Petitioners argue that other studies cited by EPA cannot compensate for EPA's flawed modeling of reliability. Br. 100. Their premise is wrong. EPA's modeling thoroughly addressed resource adequacy—the element of reliability most directly affected by the Rule. In any case, EPA cited other studies and explained that “[b]eyond resource adequacy, these studies also evaluate aspects of operational reliability.” Resource Adequacy 3, JA\_\_\_\_. That statement negates Petitioners' claim, Br. 100, that EPA conflated the two elements. EPA explained that the studies addressed the reliable-operation element by showing that a grid

with less fossil-fuel generation can still operate reliably through “increasing grid flexibility; increased utilization of power electronics ... and expanded transmission networks.” Resource Adequacy 3-4 & nn.7-18, JA\_\_\_\_ - \_\_\_\_ (citing studies). These findings bolster EPA’s conclusion that the Rule will not interfere with resource adequacy or with reliability more generally.

Petitioners argue that Quanta’s reliability study is the kind of reliability analysis that EPA should have conducted. Br. 101-02. Although EPA did not conduct its own such study for the reasons above, EPA considered “regional grid operator studies” that did address operational reliability. Resource Adequacy 3-4, JA\_\_\_\_ - \_\_\_\_.

*Third*, Petitioners attack the Model by mischaracterizing how it works. Br. 102. They claim that the Model will always assume the construction of new resources and thus “never project a resource adequacy problem.” *Id.* at 102. Not so. The Model includes a “capacity expansion decision-making framework,” Resource Adequacy 6, JA\_\_\_\_, that considers the costs and real-world limits to the capacity that can be added in a given period, IPM Documentation, Ch. 4 at 4-19 to 4-39, JA\_\_\_\_ - \_\_\_\_ (modeling new energy resources based on “cost,” “construction time needed for a unit to come online,” and “availability for each type of unit”). The Model considers real-world constraints when projecting new capacity, and if the Model cannot add generation while respecting its constraints,



then it would project a resource-adequacy problem. The Model found no such problem here.

*Fourth*, Petitioners misunderstand the Model’s assumptions about the reliability value of renewables. Br. 102-03. The Model does not assume 100% resource availability or 100% sunshine. The Model considers the percentage of time that resources are available, including both “scheduled maintenance and forced outages.” IPM Documentation, Ch. 3 at 3-12 to 3-13, JA\_\_\_\_ - \_\_\_\_, Ch. 4 at 4-19 to 4-20, JA\_\_\_\_ - \_\_\_\_\_. For variable resources like wind and solar, the Model uses “hourly generation profiles” that consider seasons and times of day. *Id.* at 4-26 to 4-27, 4-32, JA\_\_\_\_ - \_\_\_\_, \_\_\_\_; RTC, Ch. 14 at 11-12, JA\_\_\_\_ - \_\_\_\_ (distinction between “night hours and day hours” for solar-dispatch modeling). More generally, the Model recognizes specifically how wind, solar, and battery storage interact with the grid and that the reliability values of these resources decrease as renewables become a higher share of total generation. IPM Documentation, Ch. 4 at 4-28, JA\_\_\_\_; RTC, Ch. 14 at 11-12, JA\_\_\_\_ - \_\_\_\_.

*Fifth*, Petitioners are wrong that errors in EPA’s baseline skewed its analysis. EPA’s baseline modeling is generally consistent with other peer-reviewed estimates. 89 Fed. Reg. at 39822 & n.169. Unsurprisingly for complex technical models, baseline projections vary somewhat from model to model. But EPA specifically explained why its baseline differs from certain other models cited

by Petitioners, Br. 103-04, including Department of Energy models, RTC, Ch. 14 at 6-12, JA \_\_\_\_ - \_\_\_\_\_. EPA considered multiple data sources on retirement announcements, whereas the Department of Energy models relied on less comprehensive survey data that “tends to undercount retirements.” RTC, Ch. 14 at 10-11, JA \_\_\_\_ - \_\_\_\_; IPM Documentation, Ch. 4 at 4-3, JA \_\_\_\_ (explaining EPA data sources).

The Model also projects retirements for plants that cannot recover all their costs over their operating life, whereas other models do not. RTC, Ch. 14 at 11, JA \_\_\_\_\_. The Model’s retirement projections, which are based on real-world economic dynamics, are consistent with “observed historical retirement patterns.” *Id.* at 32, JA \_\_\_\_\_. This also explains why EPA’s baseline includes some retirements that have not yet been announced. Br. 107-08. Other models project fewer coal-plant retirements than have actually been announced, *id.*, indicating that the Model takes a more reasonable approach. Contrary to Intervenor’s claim, it was not “erroneous” for EPA to make reasonable economic projections, consistent with historical trends, of coal-plant retirements that have not yet been announced. Int. Br. 34.

EPA’s baseline modeling also reasonably projected the amount of new capacity needed to replace coal capacity. Petitioners’ argument about the “renewables-to-coal-fired-power replacement ratio,” Br. 105, erroneously assumes

that coal is replaced solely by renewables. Rather, coal retirements can and are projected to be addressed through a portfolio approach that includes gas, renewables, storage, and other strategies. *Supra* Argument I.E.1. In any case, the Model discounts renewable generation to account for its variable nature. IPM Documentation, Ch. 3 at 3-13 to 3-14, Ch. 4 at 4-27 to 4-28, 4-32, JA \_\_\_\_ - \_\_\_\_, \_\_\_\_ - \_\_\_\_, \_\_\_\_\_. Petitioners argue that the Model still underestimates the renewable capacity needed to replace a given megawatt of coal capacity. Br. 104-05. But they miss a key consideration: coal plants are not generally operating at full capacity. Coal-plant utilization has been decreasing for years. 89 Fed. Reg. at 39817 & n.119; Trends 22-23, JA \_\_\_\_ - \_\_\_\_\_. Petitioners overstate the renewable capacity needed to replace coal capacity that is already falling out of use. Analysis Group 36-37, JA \_\_\_\_ - \_\_\_\_ (rebutting challenges to EPA’s replacement rate).

Petitioners are also wrong that the Model does not consider the time it takes to bring renewables online, including the challenges of building transmission. Br. 106-07. The Model considers “lead time,” which “represents the construction time needed for a unit to come online.” IPM Documentation, Ch. 4 at 4-19, JA \_\_\_\_; RTC, Ch. 14 at 2, JA \_\_\_\_ (Model “does not assume instantaneous construction of electric power transmission” and assumes reasonable “pace and scale” of transmission buildout.). The Model also “includes constraints on capacity

additions through 2035 that are anchored to historical build levels.” RTC, Ch. 14 at 26, JA \_\_\_\_.

*Sixth*, Petitioners claim that EPA failed to address the inconsistent treatment of certain plants between the baseline scenario and a final Rule scenario. Br. 108-09. Petitioners fail to understand that the Model projects retirement when retirement makes economic sense for a plant, and changing cost considerations between the baseline and Rule scenarios will cause differences in projected behavior. RTC, Ch. 14 at 11, JA \_\_\_\_\_. These are not errors, but rather reasonable outputs from a complex system model that considers each unit’s economics relative to other units’ economics under changing scenarios. *See* EPA, Email to Marchetti 1, EPA-HQ-OAR-2023-0072-8911, JA \_\_\_\_\_ (explaining how Model’s consideration of broader system interactions explains certain projections). Anyway, Petitioners do not identify any pervasive error that undermines EPA’s overall conclusions.

*Lastly*, Intervenors argue that EPA should have used a probabilistic model instead because the Model “do[es] not account” for variables like generation outages and weather. Int. Br. 32-33. But the Model considers outages and historical weather data in resource availability, and it also accounts for outages through the required reserve margins. IPM Documentation, Ch. 2 at 2-7 to 2-8, 2-11, Ch. 3 at 3-8, 3-12 to 3-13, JA \_\_\_\_\_ - \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_ - \_\_\_\_\_; Resource

Adequacy 5-6, JA \_\_\_\_ - \_\_\_\_\_. The Model, which has been proven through prior EPA rulemakings, thus addresses the very considerations that Intervenors claim are missing.

**3. EPA designed the Rule to allow for reliability planning and to include added reliability safeguards.**

Although EPA projected that the Rule's effects will be incremental and can be addressed through ongoing planning, EPA adjusted the Rule between proposal and final to ensure that reliability authorities have the necessary time and flexibility to implement reliability plans. EPA adequately addressed commenters' concerns.

The Rule's subcategories and extended compliance dates provide enough flexibility and lead time to plan for reliability needs. 89 Fed. Reg. at 40012. Any coal plant with plans to retire before 2032 can continue operating without restriction until then. That is enough time for grid planners to address any reliability impacts; coal plants have on average announced retirements only a few years in advance, *id.* at 39876, and grid planners have been able to adjust plans in that time. Coal plants that will run beyond 2032 but plan to retire before 2039 can operate under less stringent requirements based on co-firing that do not apply until 2030. Plants that will operate long-term have even longer—until 2032—to meet CCS-based requirements. *Supra* Argument I.C.4. Amici led by Midcontinent Independent System Operator (“ISOs”) are wrong that the Rule will force

retirements years before the compliance deadlines. ISOs Br. 9. Although the state-plan deadline might cause a plant to make its decision before 2026 about its future operations, nothing in the Rule would cause any retirement to be so soon.

The Rule also gives States and reliability authorities flexibility to address specific reliability issues. If justified by source-specific considerations, a State can apply a less stringent standard or longer compliance schedule to an existing plant. 42 U.S.C. § 7411(d)(1) (“remaining useful life” and “other factors”). EPA provided a specific framework for how States may adjust requirements based on reliability considerations. 89 Fed. Reg. at 39971-73, 40056 (40 C.F.R. § 60.5775b(j)). A State may do so in an initial state plan or, should a reliability concern later arise, through a plan revision. *Id.* at 39971-73.

EPA included two reliability mechanisms as added safeguards. A short-term reliability mechanism allows both new and existing sources to operate more flexibly during grid emergencies. *Id.* at 40014-17. A separate reliability-assurance mechanism allows existing plants that are otherwise closing to continue operating as needed to support reliability. *Id.* at 40017-20. Separate from this Rule, the Department of Energy can order temporary electricity generation during shortages, and a source following that order is deemed not to violate environmental requirements. *Id.* at 40012; 16 U.S.C. § 824a(c). These mechanisms are not mere “band-aids,” Br. 90, but meaningful extra assurances for reliability.

Many of these flexibilities and accommodations represent an effort by EPA to adjust the Rule between proposal and final based on commenters' concerns and EPA's consultation with reliability authorities. 89 Fed. Reg. at 39803. EPA added the two reliability mechanisms in the final Rule. *Id.* at 39803, 39805-06, 40012. EPA made other adjustments that alleviate reliability concerns, including not finalizing proposed subcategories for shorter-lived coal plants and instead exempting them from requirements altogether; and providing a later deadline for CCS-based standards. *Id.* at 39805-06, 40012. Petitioners are plainly wrong that EPA "made no substantive changes" since the proposal that support reliability. Br. 95. Because the final Rule directly engaged with Petitioners' reliability concerns, Petitioners' recitation of their rulemaking comments does not support their argument. *Id.* at 90-94.<sup>32</sup>

Amici ISOs argue that EPA failed to consider four other reliability safeguards they suggested in comments. ISOs Br. 1-2. Not so. As to the first, the Rule does provide guidance on how States can use "remaining useful life" authority for reliability needs. 89 Fed. Reg. at 39971-73. As to the second, EPA

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<sup>32</sup> Intervenor's brief presents the opposite problem, relying on extra-record statements by regional transmission organizations that postdate the Rule's promulgation and cannot be considered. Int. Br. 20, 31-32; 42 U.S.C. § 7607(d)(7)(A). Anyway, those statements—like Petitioners' reliability arguments generally—rely on the false premise that the Rule's requirements are unachievable.

explained that rather than pre-designating a reliability-based subcategory, the better approach was for States to work with reliability authorities to address source-specific reliability considerations during state-plan development. RTC, Ch. 16 at 11, JA\_\_\_\_. As to the third, EPA explained that the Rule’s reliability mechanisms suffice without a regional reliability safety valve. *Id.* at 38-39, JA\_\_\_\_ - \_\_\_\_\_. As to the fourth, EPA addressed comments suggesting regional reliability allowances by explaining how States may allow emission trading to support reliability. *Id.* at 97-98, JA\_\_\_\_ - \_\_\_\_; 89 Fed. Reg. at 40013. Overall, EPA responded to comments about regional reliability approaches by acknowledging that planning processes are “among the most important tools” for reliability and explaining that the state-plan process provides space for multi-state reliability authorities to engage with their member States on regional reliability issues. 89 Fed. Reg. at 40012. Although EPA did not directly adopt all commenter suggestions, it responded to all “significant” comments, 42 U.S.C. § 7607(d)(6)(B), and carefully crafted the Rule to address stakeholders’ underlying concerns.

Amici also argue that the Rule’s short-term reliability mechanism should be triggered by an Energy Emergency Alert Level 1 event, not just Levels 2 and 3. ISOs Br. 26-27. EPA explained that Level 2 and 3 events more closely represent emergency situations; that Level 1 events could be declared too routinely; and that



inconsistent tracking of Level 1 events makes it hard to determine their impact. 89 Fed. Reg. at 40015-16. EPA reasonably explained its design choice for that reliability safeguard.

\* \* \*

In designing the Rule, EPA considered reliability in many ways. EPA assessed reliability, built time and flexibility into the Rule to accommodate reliability authorities' ongoing planning efforts, and added reliability safeguards. EPA did more than enough to "tak[e] into account" "energy requirements." 42 U.S.C. § 7411(a)(1).

Litigants challenging past EPA power-sector rules have invoked reliability concerns. Each time, the power sector has been able to adapt and avoid grid disruption. Analysis Group 4, JA\_\_\_\_. For instance, industry's reliability concerns about the 2011 Mercury and Air Toxics Standard were not borne out. RTC, Ch. 2 at 15, JA\_\_\_\_. The Clean Power Plan was stayed and never went into effect, yet the power sector achieved the Plan's targets a decade early without jeopardizing reliability. 89 Fed. Reg. at 39813. Here too, EPA left ample time for the power sector to plan an orderly path forward.

## **II. EPA's determinations regarding 40% co-firing are grounded in the record and are reasonable.**

For "medium-term" existing coal plants that intend to close before 2039, EPA reasonably determined that the best system of emission reduction is 40% co-

firing. 89 Fed. Reg. at 39841. Fuel-switching is a traditional control measure and falls well within Section 7411's scope. The record also amply supports EPA's judgment that 40% co-firing is the best system for medium-term plants and can be implemented by 2030.

**A. Fuel-switching is a permissible system of emission reduction.**

Contrary to Petitioners' contention, Pet. Br. 111-15, the Supreme Court's decision in *West Virginia*, 597 U.S. at 728-29, does not preclude 40% co-firing as the selected best system of emission reduction.

*West Virginia* considered whether the Clean Power Plan's system was impermissible because it operated "at the grid level" rather than "at the level of an individual facility." *Id.* at 715 (citation omitted). The Supreme Court held that under the major question doctrine, a grid-level system of generation-shifting exceeded EPA's authority, because it effected a "fundamental revision of the statute." *Id.* at 728. The Court explained that EPA had always previously set limits "based on the application of measures that would reduce pollution by causing the regulated source to operate more cleanly." *Id.* at 725. But by drawing this contrast, the Court made clear that "traditional" measures do fall within EPA's authority to prescribe. *Id.* at 727.

*West Virginia* then specifically identified "fuel-switching" as exemplifying the sort of traditional measure that EPA has historically relied upon for purposes of

Section 7411 regulation. *Id.* (citing 80 Fed. Reg. at 64784). The Court observed that in the Clean Power Plan, EPA considered fuel-switching as among the “potential systems of emission reduction for carbon dioxide,” and cited to the preamble’s discussion of co-firing with natural gas—*the precise system at issue here*—as a potential carbon-dioxide control. *Id.* In view of this reference, there should be no doubt that the *West Virginia* Court viewed co-firing as falling within the ambit of Section 7411.<sup>33</sup>

To be sure, EPA agrees it could not carry fuel-switching to the point of “direct[ing] existing sources to effectively cease to exist.” *Id.* at 728 n.3. But 40% co-firing does not do that. As EPA explained, it requires only “minor changes to [an existing coal plant’s] boilers.” 89 Fed. Reg. at 39902. In fact, many coal plants “are already capable of co-firing some amount of gas *without any changes at all*” to boilers. *Id.* (emphasis added). Of the 565 coal-fired units operating at the end of 2021, most (369) are located at a facility that already has a gas pipeline connection, and nearly half (249) reported already using gas as a fuel or startup source, with 29 co-firing at over 40% annual heat input basis in at least one year.

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<sup>33</sup> Petitioners’ position, Br. 112, that fuel-switching cannot entail changing to an “entirely different” kind of fuel ignores that power plants are commonly designed to combust multiple different fuels. *See, e.g.*, 89 Fed. Reg. at 39901 (noting prior Section 7411 standards that were premised on gas plants’ ability to burn either natural gas or distillate oil).

Steam Measures 13-14, JA\_\_\_\_ - \_\_\_\_\_. *Contra* Br. 115, 121 (overstating percentage of coal plants without preexisting access to gas lines).<sup>34</sup>

In short, the record amply supports EPA's conclusion that 40% co-firing is a well-demonstrated and suitable control measure for coal plants. 40% co-firing will not compel the affected plants to cease to exist or transform them into something entirely different. The control measure rather contemplates that higher-emitting coal plants will apply the same control method that their similarly situated peers are already successfully employing.

**B. EPA's selection of 40% co-firing as the best system of emission reduction complies with Section 7411(a)(1).**

**1. EPA reasonably determined that 40% co-firing is adequately demonstrated and the resultant standard is achievable.**

EPA reasonably determined that 40% co-firing is adequately demonstrated and its corresponding standard is achievable for the medium-term subcategory of

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<sup>34</sup> In arguing that 40% co-firing would improperly "redefine" the regulated source, commenters point to EPA's use of that term under the Prevention of Significant Deterioration permitting program, 42 U.S.C. § 7475. Under that different permitting program, EPA has in some circumstances eliminated from consideration pollution control techniques that would fundamentally redefine the source's purpose. But this approach has never been applied to Section 7411. And even where applicable, the approach does not preclude a permitting authority from considering options that would change aspects (either minor or significant) of an applicants' proposed facility design to achieve pollutant reductions. Thus, even if that principle were applicable, it would not preclude 40% co-firing. *See* RTC, Ch. 2 at 103, JA\_\_\_\_.

existing coal plants. 89 Fed. Reg. at 39892-94. EPA noted that “[m]any existing [coal plants] already use some amount of natural gas” and “several” have co-fired “at or above 40 percent.” *Id.* at 39892. EPA added that any plants that do not already have the capacity to 40% co-fire could modify their boilers to enable or increase gas co-firing, and connect to the gas pipeline transmission network by constructing a lateral pipeline. *Id.* at 39892-93. Based on EPA’s analysis, most of the individual pipelines needed will be less than 15 miles long. *Id.*

Petitioners do not contest that 40% co-firing is adequately demonstrated; they argue only that EPA’s presumptive standard based on 40% co-firing is unachievable. Br. 117.

Petitioners first contend that Section 7411 limits EPA to setting standards that all existing sources can achieve “*now*,” insisting that the standard here is unachievable because most plants do not presently have gas access. *See id.* at 115. Petitioners justify their argument by pointing to the statutory word “reflects”; because it is present tense, Petitioners reason, the standard must be capable of being met immediately. *Id.* But Petitioners are focusing on the wrong part of the statute; what matters, instead, is *what* the standard must reflect: “the degree of emission limitation *achievable* through the application of the best system.” 42 U.S.C. § 7411(a)(1) (emphasis added). As explained above, achievable means “capable of being accomplished.” *See supra* Argument I.C. It does not mean

capable of being accomplished *immediately* without taking any further compliance steps. Petitioners' temporal requirement has no textual basis in Section 7411.

It also defies common sense. Section 7411 requires EPA to set standards based on the "best" system of emission reduction. 42 U.S.C. § 7411(a)(1). But absent some legal or practical compulsion, sources ordinarily do not spend money on pollution-control systems, let alone on the "best" systems. The whole point of Section 7411 is to get them to do so. Moreover, implementation of *any* system will require sources to take steps to comply, steps that presumably cannot occur *instantaneously*. Limiting Section 7411 to systems that require no time and no compliance steps to implement would drain the provision of practical effect.

Petitioners also evidently reject the notion that systems of emission reduction under Section 7411 may include pipelines or comparable off-site components. Br. 116-17. But they identify no support in the statute or case law for their hypothesized limitation—and there is none. Section 7411 confers broad discretion in selecting the components of a best system. *Supra* Argument I.A. It is not unusual that pipelines (and, in the case of CCS, sequestration sites) form part of the best system that regulated plants would be expected to install (or hire contractors to install). *See* 89 Fed. Reg. at 39878. The best system often involves the construction of off-site facilities or the transportation of materials to and from the source. *See* RTC, Ch. 2 at 4-5 & n.11, JA \_\_\_\_ - \_\_\_\_\_. For example, in two

Section 7411 rules promulgated in the 1970s, EPA identified “flue gas desulfurization” as the best system for reducing sulfur-dioxide emissions from new coal plants. *See* 37 Fed. Reg. 5767, 5768-69 (Mar. 21, 1972); 44 Fed. Reg. 33580, 33592 (June 11, 1979). Using that technology entails installing scrubbers that remove sulfur dioxide from the plant’s exhaust stream, as well as building treatment facilities, pipelines, and reservoirs—many of which are off-site—to treat, transport, and store the scrubber waste. *See* Electric Utility Steam Generating Units—Flue Gas Desulfurization Capabilities as of October 1978 at 2-10 (Jan. 1979), <https://nepis.epa.gov/Exe/ZyPDF.cgi?Doc key=91010NIP.PDF>, JA\_\_\_\_ - \_\_\_\_.

Finally, *National Lime* does not support Petitioners’ position. 627 F.2d 416. There, the Court remanded a Section 7411 performance standard where EPA had failed to identify and consider variable conditions in the regulated industry that could affect covered sources’ ability to meet the relevant standard. *Id.* at 433. Here, on the contrary, EPA identified the variable conditions and obstacles facing covered sources and explained why they were surmountable. 89 Fed. Reg. at 39892-94. In particular, EPA explained that gas co-firing is a common practice at coal plants, and for the covered sources that currently lack the capacity for gas co-firing, boilers can be modified, and gas lines can be constructed. The Rule here thus did precisely what the Court found to be lacking in *National Lime*.

**2. EPA adequately considered Petitioners' comments about natural gas supply and pipeline capacity.**

Petitioners accuse EPA of failing to “consider or substantively grapple” with their concerns about pipeline capacity and whether plants can access sufficient gas for 40% co-firing. Br. 120-21. But this contention is belied by EPA’s substantial record considering these issues. *See* 89 Fed. Reg. at 39892-96; Steam Measures 8-14, JA \_\_\_\_ - \_\_\_\_; Steam Measures, Attachment 18 (Lateral Cost Estimation), JA \_\_\_\_ - \_\_\_\_; RTC, Ch. 6 at 6, JA \_\_\_\_\_. EPA’s analysis projects the “incremental development of gas supply, pipelines, and storage to satisfy the increased levels of gas use” that will be needed for sources to comply with the Rule. *See* RTC, Ch. 6 at 6, 10, JA \_\_\_\_, \_\_\_\_.

Petitioners nonetheless speculate that sources “may be unable to obtain a sufficient and consistent supply of gas” for 40% co-firing. Br. 111, 118-21. In seeking to downplay the availability of natural gas, Petitioners rely on statistics from the 2019 Rule. *Id.* at 118. But that rule and its numbers are out of date; natural gas availability has expanded since 2019, while “the existing coal-fired fleet has decreased, reducing the total mass of natural gas that might be required for sources to implement” gas co-firing. 89 Fed. Reg. at 39895.

As for Petitioners’ contention that sources require “firm access” to gas for 40% co-firing, Br. 118, EPA determined on the record that the opposite is true, *see* RTC, Ch. 6 at 10, JA \_\_\_\_\_. EPA explained that gas can be “adequately supplied



through spot purchase arrangements” to maintain co-firing. *Id.* EPA did not merely *assume* sufficient gas would be available;<sup>35</sup> it relied upon expert consultant ICF’s pipeline capacity adequacy analysis, which concluded that a sufficient volume of gas would be available even if *the entire coal fleet* opts to 40% co-fire. 89 Fed. Reg. at 39893. This is a conservative assumption because only a subset of plants are expected to opt into the medium-term subcategory. *See id.* at 39893 & n.681. In short, even if Petitioners disagree with EPA’s conclusions about the sufficiency of the gas supply, they are not unreasonable ones. *Env’t Def. Fund, Inc. v. Costle*, 657 F.2d 275,283 (D.C. Cir. 1981) (stating court must affirm the agency’s decision if a rational basis for that decision exists, even if the court disagrees).

Finally, Petitioners quibble with EPA’s response to a comment about the availability of pipeline capacity for a single North Dakota plant. Br. 120-21. But as Petitioners themselves acknowledge, EPA considered this comment and responded. *See* RTC, Ch. 6 at 6, JA\_\_\_\_. Though the Agency responded in general terms, it nonetheless satisfied its obligation. *Env’t Def. Fund*, 922 F.3d at 458 (“[A]n agency need not discuss every item of fact or opinion included in

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<sup>35</sup> Though EPA “does not agree with the assertion that firm capacity is required ... to make cofiring possible,” it conservatively assumed for purposes of its *cost analysis* that firm access would be provided. *See* RTC, Ch. 6 at 10, JA\_\_\_\_. Thus, EPA was not “merely *assuming* the opposite of a commenter’s concern.” Br. 119.

comments.” (cleaned up)). Moreover, even if the substance of Petitioners’ comment is accepted as true—and one source will need to build a 40-plus mile pipeline rather than a very short one—that does not undermine EPA’s general conclusion that “[m]ost of the 107.6 [gigawatt] coal fleet is located within 30 miles of natural gas pipelines.” RTC, Ch. 6 at 6 (emphasis added), JA \_\_\_\_.

**C. EPA reasonably determined that 40% co-firing would be cost-reasonable.**

For medium-term plants, EPA evaluated all costs associated with 40% co-firing, including pipeline infrastructure costs, and reasonably determined, applying multiple metrics, that co-firing will be cost-reasonable, notwithstanding the limited lifetime of medium-term plants. Petitioners fail to show that EPA’s conclusions were arbitrary. Br. 125-28.

EPA summarizes its cost analysis in the preamble and a technical support document. 89 Fed. Reg. at 39894-95; Steam Measures 17-20, JA \_\_\_\_ - \_\_\_\_.<sup>36</sup> As EPA explained, EPA first performed a unit-level assessment of costs and emission reductions. Steam Measures 17, JA \_\_\_\_\_. That portion of the analysis included, among other things, estimating the costs of constructing lateral natural gas pipelines for each affected unit, based on the pipeline capacity required and the location of the unit relative to the existing pipeline transmission network. 89 Fed.

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<sup>36</sup> Supporting detail is included within Natural Gas Co-Firing Memo and attachments thereto, EPA-HQ-OAR-2023-0072-0019, JA \_\_\_\_ - \_\_\_\_.

Reg. at 39894; Steam Measures 18, JA\_\_\_\_. EPA then aggregated the unit-specific estimates as part of determining fleetwide average costs and emission reductions. Steam Measures 18, JA\_\_\_\_. Recognizing that medium-term plants will close by 2039, EPA assessed fleet average costs under a nine-year amortization period (2030 through 2038), as well as under shorter periods. *Id.* at 19, JA\_\_\_\_.

Based on this robust analysis, EPA reasonably concluded that the fleet average cost metrics for 40% co-firing are favorable under this nine-year amortization period, as other past rules have required more significant expenditures per megawatt hour of generation or more significant costs per ton of carbon dioxide reduced. 89 Fed. Reg. at 39894. EPA further concluded that the cost metrics would remain reasonable for most sources even if they faced shorter amortization periods. *Id.* EPA additionally emphasized that if individual sources do have unusual circumstances and face particularly high costs (e.g., if they are unusually far from an existing pipeline network), then a State may appropriately consider that fact in its plan. *Id.* (referencing States' authority to assign a less stringent standard to a particular source based on facility-specific information).

Petitioners' attacks on EPA's cost findings are unavailing. Indeed, Petitioners fail to even acknowledge, much less address, the actual cost metrics

that EPA applied. Thus, Petitioners have forfeited any challenge to either the metrics or how EPA applied them.

And what Petitioners do say about the costs of co-firing mischaracterizes the record. Petitioners assert that EPA assumed that “pipelines near plants have sufficient capacity and that most plants would not have to build long pipelines.” Br. 127. Not so. Again, EPA assessed for all applicable individual units the cost of building pipeline capacity to supply that unit. That approach to estimating pipeline-construction costs was conservatively high inasmuch as EPA assumed the need to construct pipelines even where pipeline capacity already exists. Steam Measures 17-18, JA\_\_\_\_.

Petitioners further state that “it was incumbent on EPA” to analyze costs in view of the limited lifespan of medium-term plants. Br. 127. But EPA did just that, assessing a nine-year, and shorter, amortization periods.

Petitioners also assert, incorrectly, that EPA justified the cost-reasonableness of pipeline construction through a comparison to amounts being already invested in pipelines. *Id.* at 126 (citing 89 Fed. Reg. at 39893). But EPA advanced that comparison as part of its feasibility assessment, not its cost analysis. And Petitioners do not identify any defect with the latter.

Finally, Petitioners speculate that EPA might unreasonably disapprove State plans that account for site-specific concerns. Br. 127-28. But such speculation is unfounded, and regardless, EPA has not yet acted on any plan submission.

### **III. The Rule does not implicate the major-questions doctrine.**

The Rule falls within the heartland of EPA’s standard-setting authority and does not implicate the major-questions doctrine. This Court has already held as much in denying Petitioners’ request for a stay, stating:

Nor does this case implicate a major question under *West Virginia v. EPA*, 142 S. Ct. 2587 (2022), because EPA has claimed only the power to ‘set emissions limits under Section [7411] based on the application of measures that would reduce pollution by causing the regulated source to operate more cleanly[,]’ a type of conduct that falls well within EPA’s bailiwick, *id.* at 2610.

ECF#2065493 at 2. That reasoning is correct.

The major-questions doctrine is a “tool of statutory interpretation,” *Save Jobs USA v. U.S. Dep’t of Homeland Sec.*, 111 F.4th 76, 80 (D.C. Cir. 2024), and instructs courts, in certain “extraordinary” cases, to “hesitate” before accepting an agency’s assertion of an “extravagant statutory power” based on a “novel” reading of “modest words” or “vague terms.” *West Virginia*, 597 U.S. at 716, 723-724 (citations and quotation marks omitted). But this case does not involve any such “novel” claim of “extravagant” power. “Since passage of the Act 50 years ago, EPA has exercised [its] authority [under Section 7411] by setting performance standards based on measures that would reduce pollution by causing plants to

operate more cleanly.” *Id.* at 706. EPA followed that path here in identifying CCS and co-firing as the best systems of emission reduction.

Indeed, there is not even a textual dispute that must be resolved. *See supra* Argument I.A. Instead, Petitioners attempt to dress up ordinary arguments about whether EPA action is arbitrary or capricious in the garb of interpretive questions. That attempt fails in the absence of any plausible reading of the text that would place the measures in the Rule categorically outside EPA’s authority.

This Rule bears no resemblance to the novel Clean Power Plan rejected in *West Virginia*. That rule departed significantly from EPA’s traditional individual-source-focused framework. Instead of focusing on “equipment and practices at the level of an individual facility,” it emphasized “the energy generation mix at the grid level.” *West Virginia*, 597 U.S. at 715 (citation omitted). EPA identified as the optimal “system” for coal plants that they “reduce their own production of electricity, or subsidize increased generation by natural gas, wind, or solar sources,” *id.* at 706. The Supreme Court rejected that grid-level approach, holding that Section 7411 does not empower the Agency to “forc[e] a shift throughout the power grid from one type of energy source to another.” *Id.* at 727-28.

In this Rule, EPA accepted the Court’s direction and returned to its traditional approach of considering only technological systems that can be applied at the level of an individual plant. In doing so, EPA made no judgments as to what

an appropriate market share would be for various forms of power production. Instead, EPA straightforwardly applied measures where they are feasible and cost-reasonable to identify an achievable degree of emissions limitation—just as Congress instructed. Any resulting effects on the market share of regulated facilities are incidental. With controls in place, sources remain free to operate as much as they wish.

Petitioners advance a hodgepodge of purported bases for invoking major-questions review, all of which are unavailing:

*Economic Impacts:* Petitioners point to the fact that the Rule has significant economic impacts. Br. 129-30. But large economic stakes do not alone trigger major-questions analysis. Indeed, virtually any regulatory standards for a large industry will have them. Accordingly, courts commonly resolve cases with significant economic impacts without invoking the doctrine. *See, e.g., Becerra v. Empire Health Found.*, 597 U.S. 424 (2022) (upholding HHS rule for calculating Medicare benefits); *Sinclair Wyo. Refin. Co. v. EPA*, 101 F.4th 871 (D.C. Cir. 2024) (upholding EPA rule setting renewable fuel volume requirements).

Major-questions analysis applies only where large costs are incurred in connection with “extraordinary” and “transformative” assertions of agency power applying a novel interpretation. *West Virginia*, 597 U.S. at 721, 724. No such power has been claimed here. *Cf. Biden v. Missouri*, 595 U.S. 87, 92-97 (2022)

(upholding vaccination mandate for all healthcare facilities receiving federal funding).

Nor is there any doubt that Congress intended to convey authority to EPA to promulgate Section 7411 performance standards that would have significant environmental and economic consequences. Section 7411 is one of the “three main regulatory programs to control air pollution” from power plants, *West Virginia v. EPA*, 597 U.S. at 707, and is the one that “speaks directly to emissions of carbon dioxide,” *AEP*, 564 U.S. at 424 (quotations omitted). By authorizing EPA to regulate such emissions, Congress entrusted EPA to engage in the “complex balancing” task of weighing “the environmental benefit potentially achievable” with “our Nation’s energy needs and the possibility of economic disruption.” *Id.* at 427. Moreover, this Rule’s projected costs are not unusually large within the specific context of power-plant regulation, where costs reflect the size and ubiquity of the sources and the scope of their harmful pollution effects. The costs for the Rule are around, or lower than, the costs for other power-sector rules. 89 Fed. Reg. at 39882.

Petitioners’ arguments about this Rule’s consequences thus give this Court no reason to hesitate before honoring Section 7411’s natural reading.

*Indirect Effects:* Petitioners contend that because the standards will impose costs and will thereby have *indirect* effects on the market share of various forms of



power generation, this case should be regarded as like *West Virginia*. Br. 131-32. But *all* standards governing power plants “impose some costs on regulated plants,” and the incremental effect of any such standard may prompt some plants to close or to reduce their operations. *West Virginia*, 597 U.S. at 731 n.4. Thus, the prospect of such effects is not a sufficient basis for finding standards unlawful.

Indeed, as the *West Virginia* court emphasized, there is an “obvious difference between (1) issuing a rule that may end up causing an incidental loss of coal’s market share, and (2) simply announcing what the market share of coal, natural gas, wind, and solar must be, and then requiring plants to reduce operations or subsidize their competitors to get there.” *Id.* In promulgating the Rule, the Agency heeded *West Virginia* and returned to its traditional regulatory approach.

Petitioners also overstate the projected impacts of the Rule on plant retirements. RTC, Ch. 2 at 36-54, JA\_\_\_\_ - \_\_\_\_\_. More than half of existing coal plants have already announced that they will retire prior to 2039 or convert to gas plants regardless of this Rule. 89 Fed. Reg. at 39817-18. EPA projects that in 2040, the total amount of coal generation with the Rule will be only 7% less than in the base case without the Rule. RTC, Ch. 2 at 42, JA\_\_\_\_.<sup>37</sup>

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<sup>37</sup> Petitioners point to EPA’s projection that in 2045, after the tax credit’s scheduled expiration, most sources that install CCS would elect to retire to avoid the costs of the CCS-based standard. 89 Fed. Reg. at 39900. But EPA has committed to revisit the economic feasibility of the standards by 2041. *Supra* Argument I.D.2. In addition, its modeling results may conservatively overestimate

*Off-site activities:* Petitioners contend, Br. 133, that the Rule raises a major question because disposal of the captured pollution, through pipelines and sequestration sites, forms part of the “best system” that regulated plants would be expected to install (or hire contractors to install). But the “best system” often involves the construction of new disposal facilities or the transportation of waste materials from the source to a storage site. *See supra* Argument II.B.1. Nor is it unusual for sources to depend on contractual arrangements with third parties in implementing an emission-reduction system. RTC, Ch. 2 at 4-5, JA \_\_\_\_ - \_\_\_\_.

*Degree of Stringency:* Petitioners contend that the major-questions doctrine is triggered because they believe the standards will be difficult to meet. Br. 133. But that is just another way of saying that Petitioners believe the standards are too stringent—a claim that is reviewed under the arbitrary-and-capricious standard.

*Expertise:* Petitioners claim that EPA lacks relevant expertise on grid reliability. Br. 130. But in Section 7411(a)(1), Congress specifically tasked EPA with making judgments regarding the best emission control systems in view of anticipated impacts on “energy requirements.” And EPA *does* have expertise in determining the effects of at-the-source pollution controls on the electricity sector.

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the amount of plant retirements because they “generally do not account for numerous potential changes that may occur over the next 20” years, “any of which may enable these units to continue to operate economically [with CCS] for a longer period.” 89 Fed. Reg. at 39900.

*See* 168 Cong. Rec. E879 (Aug. 26, 2022) (“Congress has full confidence that EPA has sufficient expertise” to regulate under Section 7411 in view of “EPA’s robust understanding of the electric power industry, its underlying economics ... its mechanisms to maintain reliability ... and other components.”); *see also* *AEP*, 564 U.S. at 427-28. Regardless, the applicable standard of review for EPA’s judgments is the arbitrary-and-capricious standard.

*Recent Legislation:* Petitioners assert, Br. 130, that Congress in recent legislation has declined to enact, or otherwise failed to support, EPA’s present regulatory approach. But that claim is incorrect. Petitioners cite to three bills as purportedly reflecting “failed congressional attempt[s] to impose CCS,” but none of those cited bills even addressed CCS at power plants. *Id.* Much more probative is the recently enacted Inflation Reduction Act, which underscored Congress’ expectation that EPA would impose meaningful Section 7411 standards on power plants mindful of the tax credits in the Act supporting CCS. *See supra* Argument I.D. In any event, the Rule falls within the heartland of EPA’s Section 7411 authority.

*Presumption of regularity:* Finally, Petitioners cast aspersions on EPA’s motives, intimating that EPA is “intentionally” aiming to eliminate fossil fuel-fired plants from the market. Br. 133. But EPA made clear that the Rule “is not directed at improvement of the overall power system.” 89 Fed. Reg. at 39899.

Instead, “each affected source is able to apply [the best system] to its own facility to reduce its own emissions.” *Id.* A “presumption of regularity” attaches to EPA’s explanation for the action. *Citizens to Pres. Overton Park, Inc. v. Volpe*, 401 U.S. 402, 415 (1971).

In short, the motions panel correctly determined that the major-questions doctrine does not apply. And even if it did, Section 7411’s text provides the “clear congressional authorization” that the doctrine demands. *West Virginia*, 597 U.S. at 723. Indeed, Petitioners present no plausible reading that would put the Rule’s measures beyond EPA’s authority to adopt on a proper record.

#### **IV. The Rule respects the Clean Air Act’s cooperative-federalism framework.**

Petitioners argue that EPA unlawfully restricted States’ discretion to regulate existing plants. Br. 135-50. That argument is misdirected and wrong. The Rule maintains States’ ability to set existing-source standards and to consider source-specific factors when doing so. Petitioners’ core disagreement is with EPA’s separately promulgated Section 7411(d) implementing regulations, not this Rule. Challenges to those regulations are not properly presented here.

EPA has the “the primary regulatory role” under Section 7411(d). *West Virginia*, 597 U.S. at 710. States “set the actual rules governing” existing sources, but it is the “Agency, not the States,” that “decides the amount of pollution reduction that must ultimately be achieved.” *Id.* The statute, after all, assigns

responsibility to EPA to determine the best system of emission reduction and the degree of emission limitation achievable. 42 U.S.C. § 7411(a)(1). EPA made those determinations in this Rule’s emission guidelines.

States have discretion to deviate from the degree of emission limitation identified in emission guidelines only when justified by a facility’s “remaining useful life” or other source-specific factors. *Id.* § 7411(d)(1). EPA’s implementing regulations, which apply to all Section 7411(d) emission guidelines, govern this process. The implementing regulations require that States establish standards that are “no less stringent than” EPA’s emission guidelines, except that a State may apply a less stringent standard based on source-specific factors. 40 C.F.R. § 60.24a(c), (e). To do so, a State must show “fundamental differences” between information specific to the facility and information that EPA considered in emission guidelines. *Id.* § 60.24a(e)(2).

This Rule does not amend or readopt those implementing regulations. Rather, EPA stated that “the [remaining useful life] provisions in 40 CFR 60.24a ... will govern ... under these emission guidelines.” 89 Fed. Reg. at 39962. EPA expressed clearly that comments about the implementing regulations were “outside the scope” of this Rule. *Id.* at 39963.

Petitioners’ attack on the “fundamental differences” standard in § 60.24a is therefore misdirected. Br. 135, 143-44. EPA promulgated that standard not as part

of this Rule, but as part of the separate rulemaking that revised the implementing regulations. The same is true for the “factors and evaluation metrics” language in § 60.24a(f)(1), which pertains to how States determine what less stringent standard to set. Br. 145-46. Almost all State Petitioners are challenging the revised implementing regulations in a separate pending case. *West Virginia v. EPA*, No. 24-1009 (D.C. Cir.) (challenging EPA’s rule, 88 Fed. Reg. 80480 (Nov. 17, 2023)). Those arguments must be raised there, not here.

Anyway, Petitioners are wrong that the implementing regulations improperly limit States’ discretion. As EPA explained in defense of those regulations, Respondents’ Brief, *West Virginia*, No. 24-1009 (D.C. Cir. Aug. 22, 2024), ECF#2071489, the statute does not confer unbounded discretion on States to consider source-specific factors in a way that undermines EPA’s “primary regulatory role.” *West Virginia*, 597 U.S. at 710. Rather, the statute directs EPA to establish regulations that govern States’ consideration of source-specific factors, 42 U.S.C. § 7411(d)(1), as EPA has done for decades, *see* 40 Fed. Reg. 53340, 53347 (Nov. 17, 1975).

Petitioners are also wrong that the Rule’s “presumptive standards” improperly supersede the States’ standard-setting role. Br. 141. The Rule provides States with a methodology for establishing standards that reflect the degree of emission limitation EPA determined in the emission guidelines and that are thus

“presumptively approvable.” 89 Fed. Reg. at 39956-57. But the Rule does not require States to use the methodology; in fact, it provides additional options for States. *Id.* at 40055 (40 C.F.R. § 60.5775b(e)). Further, the presumptive standards do not limit States’ ability to set less stringent standards under the “remaining useful life and other factors” provision in the implementing regulations. 40 C.F.R. § 60.24a(e)-(h).

Petitioners argue that EPA made it too hard to deviate from the presumptive standards, but that again is an objection to EPA’s implementing regulations and is not properly raised here. Or, to the extent that Petitioners are concerned that EPA will apply the implementing regulations too restrictively, then that is a premature challenge to a hypothetical future state-plan disapproval. *See* Br. 143 (arguing that “EPA lacks broad power to reject State plans”), 144 (questioning whether “EPA will give any consideration to [certain] factors in evaluating a State plan”). EPA’s action on a state-plan submission will be a future final action subject to judicial review. 42 U.S.C. § 7607(b)(1). Speculation that EPA may someday disapprove a State’s deviation from the Rule’s presumptive standards does not support a challenge to this Rule.

The remaining federalism arguments also lack merit. Petitioners argue that by subcategorizing existing coal plants based on operating horizon, EPA foreclosed States’ discretion to consider “remaining useful life.” Br. 143.

Although EPA did consider plants' lifespans in subcategorization, EPA explained that States nonetheless remain free to further consider the "remaining useful life" of any particular source. 89 Fed. Reg. at 39891, 39963-64. Any speculation that EPA might fail to approve such further consideration in a state plan is not ripe for review.

Petitioners' argument about the federalism canon is also misdirected. Br. 148-49. The statutory-interpretation issue raised by Petitioners—to what extent States may deviate from EPA's determinations—is not a challenge to this Rule but rather a challenge to the implementing regulations that govern state-plan submission and review.

In any case, Petitioners are wrong that the federalism canon applies because of EPA's regulation of an area traditionally left to States. *Id.* at 149. The Rule regulates air-pollutant emissions, as EPA is authorized to do under Section 7411. *West Virginia*, 597 U.S. at 710. The Rule does not dictate what electricity sources may operate in a State; it is not utility regulation of the sort traditionally left to States. Intervenors' federalism argument is misguided for the same reason. Int. Br. 37-39. Finally, the Federal Power Act provision that Intervenors cite is inapplicable. Int. Br. 38 (citing 16 U.S.C. § 824o(i)(3)). That provision merely provides that nothing in that statute shall preempt States' authority over reliability; it does not limit EPA's Clean Air Act authority.



In sum, the Rule maintains the role of States in setting existing-source standards and in considering source-specific factors. EPA will review state plans by applying its general implementing regulations. Petitioners' federalism arguments target those other regulations, or how they may be applied in the future, not anything in this Rule.

**V. Petitioners' and Intervenor's remaining claims lack merit.**

The remaining claims lack merit.

**A. EPA may subcategorize sources based on operating horizon.**

EPA reasonably created an applicability exemption for existing coal plants that intend to retire by 2032 and divided the remaining plants into two subcategories: medium- and long-term. These classifications are valid and should be upheld. *Contra* Br. 150-52.

Section 7411(b)(2) grants EPA broad discretion to “distinguish among classes, types and sizes within categories of new sources for the purpose of establishing [new source] standards.” 42 U.S.C. § 7411(b)(2). Section 7411(d)(1) does not explicitly address subcategorization for existing sources, but no one contests that it authorizes a similar approach for existing sources, where EPA identifies the best system for those sources in the same manner. *See* 89 Fed. Reg. at 39828 (citing 40 Fed. Reg. 53340 (Nov. 17, 1975)).

EPA’s Section 7411(d) implementing regulations provide that EPA “may specify different degrees of emission limitation or compliance times or both for different sizes, types, and classes” of existing sources “when costs of control, physical limitations, geographical location, or similar factors make subcategorization appropriate.” 40 C.F.R. § 60.22a(b)(5).

Here, EPA recognized an important aspect of the problem related to control costs: controls become more cost-effective over time where capital costs can be amortized. 89 Fed. Reg. at 39840-41. However, in the case of existing coal plants, a large percentage of sources have already announced dates for ceasing operation (and more are expected to do so). *Id.* at 39890. In creating an applicability exemption for sources that will close by the end of 2031, EPA appropriately determined that the costs of installing carbon-capture or gas co-firing technologies would not be reasonable for such plants. EPA further was mindful that many industry stakeholders submitted comments urging EPA to provide this kind of approach, in view of their retirement plans. *See id.* at 39891 n.677.

EPA also reasonably subcategorized the remaining plants into medium- and long-term subcategories. As EPA explained, for an amortization period of more than seven years, CCS costs are reasonable. *Id.* at 39841. Therefore, CCS is the best system for sources that will remain in operation after January 1, 2039. *Id.* But for medium-term plants that intend to close before January 1, 2039 (and operate

after January 1, 2032), the amortized costs of CCS are higher and as a result, co-firing is the best system. *Id.*

Not surprisingly (as it inures to their benefit), many industry Petitioners support the applicability exemption and do not join the remaining Petitioners' arguments contesting EPA's subcategorization authority. *See* Br. 21 n.4. But the remaining Petitioners fail to demonstrate any error.

As an initial matter, the Petitioners pursuing this argument advance a false premise. They say, *id.* at 150, that EPA improperly made a facility's planned retirement date "part of the standard of performance itself." Not so. A facility's planned retirement date is a condition for subcategory applicability, but it is not itself a performance standard. *See* 89 Fed. Reg. at 40048-49 (40 C.F.R. § 60.5740b). And to be very clear, nothing in the Rule compels any source to retire. Under the Rule, each source is free to remain in operation for as long as it wishes. A source with closure plans that places itself into the medium-term subcategory, or that avails itself of the applicability exemption, is making its own decision to retire by a certain date, and voluntarily taking itself out of the long-term subcategory.

In any event, Petitioners' textual argument is nonsensical. The statutory text authorizes distinctions among "classes, types, and sizes" of categories. 42 U.S.C. § 7411(b)(2). The word "class" is capacious—encompassing any category of things having some property or attribute in common—and easily covers

distinctions between plants based on their operating horizon. *See Webster's* 262 (defining “class” as a “number of people or things grouped together because of certain likenesses or common traits”). Moreover, although Petitioners neglect to call attention to them, EPA’s implementing regulations also explicitly authorize consideration of “costs of control” in subcategorizing. 40 C.F.R. § 60.22a(b)(5). And because amortization periods directly relate to the costs of control, Petitioners’ argument amounts to an impermissible, and untimely, collateral attack on those regulations.

Petitioners are also incorrect in asserting that the Rule’s subcategories usurp States’ authority under Section 7411(d) to consider a power plant’s remaining useful life when setting standards for individual sources. First, for plants subject to the applicability exemption, there is no standard of performance that needs to be set, so States’ authority to consider remaining useful life is not implicated. And for other sources subject to the Rule, a State remains free to particularize a standard of performance to the circumstances of a particular plant. 89 Fed. Reg. at 39891. EPA’s authority to determine the best system of emission reduction for a subcategory of plants is distinct from a State’s authority to invoke “remaining useful life or other factors” for individual sources within a subcategory. *Id.*

**B. EPA's approach to gas plant subcategorization was reasonable.**

This Court should not reach Intervenors' argument concerning the relative treatment of different subcategories of new gas plants. No petitioner advances this argument, so it is improper, and Intervenors identify no "extraordinary" reason for its consideration. *Supra* Argument I.D.3.a. Intervenors also lack standing. *See id.*

Even if properly raised, Intervenors' argument is meritless: EPA reasonably explained its differing approach to baseload and lower-load gas plants, and the record refutes Intervenors' suggestion that EPA's approach unfairly "penalizes" more efficient gas plants and "conflicts with [EPA's] lower-emission goal." Int. Br. 1-2, 7-11.

EPA's approach here was sound. Gas plants built to operate as baseload units, defined here as those operating at or above a 40% capacity factor, are typically "combined-cycle" turbines. *See* 89 Fed. Reg. at 39811, 39911. Combined-cycle turbines operate more efficiently than other gas plants by using the hot exhaust from the primary gas turbine to generate steam, which drives a secondary steam turbine that generates additional electricity. *Id.* Because that second steam "cycle" serves to cool down the hot exhaust, it is also the technical element that allows for CCS, which requires cool exhaust. *Id.* at 39926 & n.762.

Intermediate- and low-load plants, by contrast, produce power during periods of high demand or when other resources, like renewables, are unavailable.

*Id.* at 39811, 39903. These plants are primarily “simple-cycle” turbines, whose single combustion turbine can more rapidly cycle on and off according to electricity demand. *See id.*; *id.* at 39909, 39911. Because they have no secondary system to turn waste heat into additional power, exhaust from simple-cycle turbines is too hot to be routed to CCS without additional equipment. *Id.* at 39918, 39909. EPA accounted for this technical distinction in its “best system” analysis, explaining that while CCS was appropriate for (combined-cycle) baseload gas plants, the system was presently too expensive for (simple-cycle) lower-load plants. *Id.* EPA found instead that the “best” system for intermediate-load plants was highly efficient generation and for low-load plants was using lower-emitting fuels. *Id.* at 39917-20.

Intervenors’ hazy claims of arbitrariness or inconsistency lack legal foundation. They claim that EPA erred in selecting CCS for baseload plants when other plants were “exempt[.]” Int. Br. 1, 7-8. But they challenge neither EPA’s authority to subcategorize nor the definitions of its subcategories. Nor do they challenge EPA’s best system determinations for intermediate- and low-load facilities—or that EPA was required to select the best system for each subcategory, including baseload units. *See id.* at 7-11. As this brief shows, EPA’s best system determinations were reasonable, particularized to each source type, and explained

on the record. So the fact that EPA did not regulate all gas plants in the same manner is neither illogical nor improper.

Intervenors' suggestions that EPA's approach "penalizes" more efficient baseload gas units and "conflicts with [EPA's] lower-emission goal," *id.* at 10-11, are also factually flawed. First, the baseload gas standard does not penalize efficient generators. Petitioners claim source owners will have no choice but to operate combined-cycle turbines under a 40% capacity factor (or rely on smaller facilities) because of the "enormous costs of CCS," which they say will "probably" prevent such units from being dispatched for generation. *Id.* at 9-11. But this argument collapses into an allegation that CCS is unreasonably costly, which is incorrect. *Supra* Argument I.D. As noted above, EPA specifically found that "the economic incentive provided by the [45Q] tax credit is so significant on a \$/ton basis that the EPA expects [baseload gas] sources to dispatch at *higher* levels while the tax credit is in effect." 89 Fed. Reg. at 39934-35 (emphasis added).<sup>38</sup>

It is true that the Rule does not bar combined-cycle turbines from opting to run at capacity factors that would place them in the intermediate-load subcategory if they find that economically preferable, but Intervenors are incorrect that units

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<sup>38</sup> That conclusion accounted for transport and sequestration costs, *see* Gas Measures, Attachment 1 (NETL Costs), JA\_\_\_\_ (Tab "Bit Partial Cap. 2022, Rev 4a" at Row 81 "CO2 TS&M Costs"). *Contra* Int. Br. 9-10.

running 90% CCS could not operate economically enough to be dispatched.<sup>39</sup> The record showed developers are, in fact, opting to build new baseload gas plants with CCS. 89 Fed. Reg. at 39927-29; *cf. id.* at 39928, 39935 n.833 (discussing CCS plans of existing gas plants).

More significantly, EPA showed that even accounting for potential adjustments in gas plants' operating behavior in response to the Rule—including decisions to decrease capacity factors rather than install CCS—the Rule will significantly decrease carbon-dioxide emissions, and will secure more reductions with these gas standards than without. RIA, Appendix D (Table D-4), JA\_\_\_\_ (showing reductions from the whole Rule—"Final" column—exceed those from coal standards alone—"Existing Source Rule Only" column); RTC, Ch. 2 at 56-57, JA\_\_\_\_-\_\_\_\_. Reducing emissions of dangerous pollution is EPA's fundamental mandate under the Clean Air Act; Intervenor's insinuation that EPA could have achieved more reductions by *declining* to regulate baseload gas units is unfounded.

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<sup>39</sup> A unit's conclusions about the most economic option would not amount, in any case, to a "penalty." EPA correctly applied the statute and incidental market effects were within the contemplation of Congress. *See supra* Argument III; RTC, Ch. 2 at 149, JA\_\_\_\_. Plus, the record shows new gas plants are increasingly likely to operate as intermediate units regardless of the Rule. 89 Fed. Reg. at 39823.



**C. The record sufficiently shows that coal-refuse plants can comply with the Rule.**

Coal-refuse plants are a small part of the power industry. There are sixteen such plants with a combined capacity under 1,500 megawatts. *See* Energy Info. Admin, Form EIA-860, <https://www.eia.gov/electricity/data/eia860> (Schedule 3, Generator Data, 2022). This capacity amounts to about 0.8% of the power sector's total coal capacity. *Id.*

Petitioners contend EPA erred by not responding to comments concerning, among other things, the “impracticability” of applying EPA’s best system determinations to coal-refuse plants. Br. 159. But EPA *did* address this point in the record, which shows that coal-refuse plants can implement 40% co-firing and 90% CCS. 89 Fed. Reg. at 39842, 39854, 39886; RTC, Ch. 6 at 5, JA\_\_\_\_. Because of this determination, EPA committed no error by not responding to corollary comments stating that coal-refuse plants provide greenhouse-gas benefits and warrant their own subcategory. Br. 159. Under the Rule, coal-refuse plants can continue to operate *and* reduce their emissions through co-firing or CCS. Thus, these latter comments were not independently “significant” and therefore required no response. *See* 42 U.S.C. § 7607(d)(6)(B).

The Rule’s administrative record shows that coal-refuse plants can implement 40% co-firing and CCS. *Contra* Br. 156-58. Coal-refuse plants combust coal refuse, also known as waste coal, using circulating fluidized bed

boiler technology. Appalachian Region Independent Power Producers Association (“ARIPPA”) Comment 1, EPA-HQ-OAR-2023-0072-0708, JA\_\_\_\_. In its response to comments, EPA made clear that coal-refuse plants employing this technology can co-fire natural gas. *See* RTC, Ch. 6 at 5, JA\_\_\_\_ (“The waste coal-fired [circulating fluidized bed] utility boiler at Grant Town has historically fired natural gas at high levels.”). As for CCS, EPA concluded in the preamble that plants combusting any type of coal, “including waste coal,” can implement carbon capture. 89 Fed. Reg. at 39854 (basing this conclusion on the “broad range” of amine solvents and the fact that capture processes can accommodate different types of coal). The administrative record also shows that, despite Petitioners’ concerns, Br. 158, small coal plants, like most coal-refuse facilities, can implement and site CCS technology. 89 Fed. Reg. at 39842 (applying the Rule to plants as small as 25 megawatts); *id.* at 39886 (concluding that all existing coal plants have sufficient space to install carbon-capture equipment).

Regulatory issues likewise do not preclude coal-refuse plants from 40% co-firing.<sup>40</sup> *Contra* Br. 157. Petitioners argue that they cannot implement 40% co-firing *and* comply with the Public Utility Regulatory Policies Act (“PURPA”), 16 U.S.C. §§ 2601-2645, because PURPA’s regulations require that “75% of the heat

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<sup>40</sup> Petitioners do not contend that regulatory issues preclude CCS implementation at coal-refuse plants.

input to the boiler must come from waste coal,” Br. 157. But Petitioners neglect to mention that coal-refuse plants need not comply with that act; compliance just brings certain benefits. *See Portland Gen. Elec. Co. v. FERC*, 854 F.3d 692, 694-95 (D.C. Cir. 2017) (describing PURPA regulatory scheme and its benefits for “qualifying facilities”). Though Petitioners state that inability to obtain PURPA benefits would put them in “a bind,” neither Petitioners’ brief nor their administrative comments say whether any coal-refuse facilities are in fact currently relying on these benefits, much less that they *require* these benefits to stay economically viable. There is reason to doubt that most coal-refuse facilities are in fact relying on the main PURPA benefit.<sup>41</sup> But even if a given plant is relying on PURPA, and if that reliance would make achieving the degree of emission limitation commensurate with 40% gas co-firing unreasonable, the State in which that plant resides can account for those circumstances in its state plan and potentially apply a less stringent standard for that source. 89 Fed. Reg. at 39860.

As for Petitioners’ concerns about the Rule’s costs for coal-refuse plants, Br. 158-59, EPA’s cost analysis concludes that implementation of 40% co-firing and

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<sup>41</sup> The primary PURPA benefit is the requirement imposed on electric utilities to purchase power from “qualifying facilities” at prices comparable to the utilities’ avoided costs. *See Portland Gen. Elec.*, 854 F.3d at 695 (citing 16 U.S.C. § 824a-3(a)-(d)). In 2005, this requirement was generally eliminated for new or renewed contracts within the PJM Interconnection, which includes all of Pennsylvania, where most coal-refuse plants reside, ARIPPA Comment 52-53, JA \_\_\_\_ - \_\_\_\_\_. *See* 18 C.F.R. § 292.309.

90% CCS is generally cost-effective for existing coal-fired steam generating plants, 89 Fed. Reg. at 39879-83, 39932-35 (CCS), 39894-95 (gas), a category which includes coal-refuse plants, 40 C.F.R. § 60.5580 (defining “coal” to include “coal refuse”). Petitioners’ conclusory contention that coal-refuse plants cannot amortize the costs of Rule compliance, Br. 158-59, does not grapple with, let alone refute, EPA’s robust cost analysis. Though not mentioned in Petitioners’ brief, the coal-refuse trade association’s comments assert that these plants have a lifetime which “could range from 10 to 30 years or more.” ARIPPA Comment 18-19, JA\_\_\_\_-\_\_\_\_. This estimated plant lifespan would not preclude amortization under EPA’s cost analyses. *See* 89 Fed. Reg. at 39879 (finding seven-year amortization period for CCS cost-effective), 39894 (finding two-year period for 40% co-firing cost-effective).

In sum, because the record shows that coal-refuse plants can install 40% co-firing or 90% CCS, EPA need not have responded in detail to that industry’s corollary comments. Further, EPA did not err in declining to subcategorize these plants and assigning them less stringent standards particularly given the state planning process. *Contra* Br. 156-57. If a particular coal-refuse plant cannot reasonably achieve the presumptive standards based on technical challenges with co-firing or reasons related to PURPA, or because it cannot implement CCS for cost or space reasons, *see* Br. 154-59, the State in which that plant resides can

account for those circumstances in its state plan by setting a less stringent standard for that plant, 89 Fed. Reg. at 39964-66.

If the Court concludes that EPA procedurally erred by not responding to certain coal-refuse industry comments, any such error would be harmless. *See* 42 U.S.C. § 7607(d)(8). Under Section 7607(d)(8), the alleged procedural error (i.e., the failure to respond to administrative comments) must be “so serious and related to matters of such central relevance to the rule that there is a substantial likelihood that the rule would have significantly changed” without the error. *Id.*; *see also Am. Petroleum Inst. v. Costle*, 665 F.2d 1176, 1184, 1189 (D.C. Cir. 1981) (concluding procedural error was harmless and noting that “procedural defaults under the Act will be rare”). Here, even if EPA had more fulsomely responded to the comments, EPA would not have created a subcategory imposing less stringent emission reductions for coal-refuse plants. That is because coal-refuse plants can generally implement 40% co-firing and 90% CCS.

**D. EPA may regulate coal plants under Section 7411(d) and Section 7412.**

As Petitioners acknowledge, the panel is bound by this Court’s prior ruling *Am. Lung Ass’n*, 985 F.3d 914, 978-88 (D.C. Cir. 2021) (rev’d on other grounds), holding that Section 7411(d) authorizes EPA to regulate carbon-dioxide emissions from power plants where other pollutants from these plants are regulated under Section 7412.

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For the foregoing reasons, Petitioners are not entitled to relief. But any relief the Court is inclined to grant should be limited to the portions of the Rule held unlawful. *See* 89 Fed. Reg. 39802 (explaining that the Rule's components are severable).

### CONCLUSION

The petitions should be denied.

Respectfully submitted,

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### CERTIFICATE OF COMPLIANCE

1. This document complies with the Court's order of August 9, 2024 because, excluding the parts of the document exempted by Federal Rule of Appellate Procedure 32(f) this document contains 31,965 words.

2. This document complies with the typeface requirements of Federal Rule of Appellate Procedure 32(a)(5) and the type-style requirements of Federal Rule of Appellate Procedure 32(a)(6) because this document has been prepared in a proportionally spaced typeface using Microsoft Word 2016 in 14-point Times New Roman font.

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